



2022

## Tokenized: The Law of Non-Fungible Tokens and Unique Digital Property

Joshua A.T. Fairfield

*Washington and Lee University School of Law, fairfieldj@wlu.edu*

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### Recommended Citation

Joshua A.T. Fairfield, *Tokenized: The Law of Non-Fungible Tokens and Unique Digital Property*, 97 *Ind. L.J.* 1261 (2022).

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# Tokenized: The Law of Non-Fungible Tokens and Unique Digital Property

JOSHUA A.T. FAIRFIELD\*

*Markets for unique digital property—digital equivalents of rare artworks, collectible trading cards, and other assets that gain value from scarcity—have exploded in the past few years. At root is the next iteration of blockchain technology, unique digital assets called non-fungible tokens. Unlike bitcoin, where one coin is the same as another, NFTs are unique, each with different attributes. An NFT that represented ownership of Boardwalk would be quite different from one that represented Baltic Avenue.*

*NFTs have grown from a few early breakout successes to a rapidly developing market for unique digital treasures. The attraction to buyers is that, unlike digital assets like e-books or licensed movies, NFTs can be bought, sold, displayed, gifted, or even destroyed just like personal property. Yet law has not kept pace with demand for unique digital property. In particular, the rules designed for the 2000s internet focused on expanding intellectual property licenses and online contracts to the point that consumers are mere users, not owners, of digital assets. This “end of ownership” legal structure stands in stark contrast to the expectations of those who create, buy, sell, and invest in NFTs.*

*This article proposes a clear path for the evolution of the legal underpinnings of NFTs. It argues that NFTs are personal property, not contracts (despite the “smart contracts” popular nomenclature) or pure intellectual property licenses (despite the currently governing law of digital assets like e-books). Because transactions in NFTs are in the form of a sale, the law of sales of personal property should apply. And finally, the article notes that NFTs will serve as a powerful, grounding example of digital personal property, a legal form of ownership that is both sorely needed and has not yet been clearly established online. That example will ground others, and permit law to again characterize those who buy scarce and valuable digital assets as true owners rather than mere users.*

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\* Joshua A.T. Fairfield, William D. Bain Family Professor of Law, W&L University School of Law. Thanks go to Aaron Wright, Gus Hurwitz, Kiel Brennan-Marquez, Aaron Perzanowski, Leandra Lederman, Chris Seaman, Juliet Moringiello, Chris Odinet, and all of the participants in the Law and Technology Workshop Series. Thanks to the Frances Lewis Law Center for funding in support of this scholarship, and thanks to Nate Reynolds and John Coffron for research support.

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“We have tons of digital stuff, we’ve just never really owned it.”  
—The NFT Bible<sup>1</sup>

## INTRODUCTION

Rare and unique items used to be limited to physical space. People buy and trade baseball cards, rare coins, and stamps. The next generation of blockchain technology is now taking scarcity and uniqueness online, making ownership of truly unique digital artifacts possible. In August 2020, a one-of-a-kind Mike Trout baseball card sold for \$3,936,000, eclipsing the previous 2016 record for the sale of a 1909 Honus Wagner T-206 card for \$3.12 million.<sup>2</sup> On November 21, 2020, a digital pet named Axia, based on the *Pokémon* concept, rage-tweeted that its sale price was \$97,000.<sup>3</sup> In 2018, a unique digital pet named Dragon sold on the Ethereum blockchain for \$170,000.<sup>4</sup> Just like the trading cards, Axia and Dragon are rare, even unique. The

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1. Devin Finzer, *The Non-Fungible Token Bible: Everything You Need to Know About NFTs*, OPENSEA (Jan. 10, 2020), <https://blog.opensea.io/guides/non-fungible-tokens/> [<https://perma.cc/BPX5-K7J4>].

2. Tom VanHaaren, *Mike Trout Rookie Card Becomes Highest-Selling Sports Card of All Time*, ESPN (Aug. 23, 2020), [https://www.espn.com/mlb/story/\\_id/29723239/mike-trout-rookie-card-becomes-highest-selling-sports-card-all](https://www.espn.com/mlb/story/_id/29723239/mike-trout-rookie-card-becomes-highest-selling-sports-card-all) [<https://perma.cc/Q899-H8PJ>].

3. @axie265, TWITTER (Nov. 21, 2020, 10:11 PM), <https://twitter.com/axie265/status/1330348183638183936> [<https://perma.cc/RS8V-WTHX>].

4. Chuong Nguyen, *Cat Got Your Wallet? CryptoKitties Virtual Feline Fetches \$170K in Crypto Cash*, DIGITALTRENDS (Sept. 5, 2018), <https://www.digitaltrends.com/computing/>

difference between the digital pets and the card is that the card exists in real space while the pets exist in virtual space. All still derive value from their scarcity.

People are buying digital assets at confoundingly high rates as more entities begin to buy into the concept of non-fungible tokens, or NFTs. The MLB and NBA both curate digital collectible marketplaces backed by distributed ledger technology. MLB runs MLB Champions where users can buy baseball player bobbleheads and use them in a game.<sup>5</sup> The NBA runs NBA Top Shot which allows users to buy “Moments” of great plays that have been stored in tradable virtual cubes.<sup>6</sup> Sales from Top Shot surpassed \$700 million in less than a year.<sup>7</sup> The market for NFT collectibles and art grew 115% in December 2020 alone.<sup>8</sup> In 2021, the sales of NFTs reached \$25 billion.<sup>9</sup> A single NFT artwork sold for \$69.3 million at a Christie’s sale in March 2021, setting a new record in the community.<sup>10</sup> In 2021 and 2022, NFT sales from the Bored Ape Yacht Club, a single NFT art seller, totaled more than \$1 billion as celebrities started to buy the apes.<sup>11</sup> The NFT market has gone vertical, and it is time to examine the legal underpinnings of the exploding trade in digital personal property.

What makes these assets valuable is that they are one-of-a-kind. Offline, we take the properties of rivalrousness and uniqueness for granted. Rivalrousness is the idea that if I have a thing, you don’t.<sup>12</sup> If I give it to you, you have it, and I don’t. Uniqueness is a related and extended version of rivalrousness. If I have a unique object, there is no replacement for it. Individual baseballs may be rivalrous with each

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dragon-cryptokitties-most-expensive-virtual-cat/ [https://perma.cc/8KWH-FRUR].

5. See *Frequently Asked Questions*, MLB CHAMPIONS, <https://www.mlbc.app/faq> [https://perma.cc/BL2A-Q4DB].

6. See Dapper Labs, Inc., *Dapper Labs Opens NBA Top Shot Beta to All Fans*, PR NEWSWIRE, Oct. 1, 2020, <https://www.prnewswire.com/news-releases/dapper-labs-opens-nba-top-shot-beta-to-all-fans-301144010.html> [https://perma.cc/L9XN-MVS2].

7. Danny Nelson, *Dapper Labs’ NBA Top Shot Has Crossed the Million-User Mark*, COINDESK (Sept. 14, 2021, 9:01 AM), <https://www.coindesk.com/business/2021/05/25/dapper-labs-nba-top-shot-has-crossed-the-million-user-mark/> [https://perma.cc/RLZ2-RJHE].

8. See Harrison Seletsky & Ryan Smith, *NFT Market Takes Off with 115% Month Over Month Growth*, BEINCRYPTO (Dec. 17, 2020, 7:58 PM), <https://beincrypto.com/nft-market-takes-off-with-115-month-over-month-growth/> [https://perma.cc/8X5S-5B4R] (describing exceptional growth and record-breaking sales for NFTs).

9. Elizabeth Howcroft, *NFT Sale Hit \$25 Billion in 2021, but Growth Shows Signs of Slowing*, REUTERS (Jan. 11, 2021, 10:50 AM), <https://www.reuters.com/markets/europe/nft-sales-hit-25-billion-2021-growth-shows-signs-slowing-2022-01-10/> [https://perma.cc/RA79-HJWL] (reporting NFT growth through 2021 and cataloging record NFT sales).

10. *Id.*

11. Isabelle Lee, *Sales of Bored Ape Yacht Club NFTs Jump Past \$1 Billion amid Heightened Interest from Celebrity Collectors*, INSIDER (Jan. 4, 2022, 11:56 AM), <https://markets.businessinsider.com/news/currencies/bored-ape-yacht-club-nft-sales-1-billion-opensea-bayc-2022-1> [https://perma.cc/D6GA-3Z3N] (reporting sales of Bored Ape Yacht Club NFTs have surpassed \$1 billion).

12. See JOSHUA A.T. FAIRFIELD, OWNED: PROPERTY, PRIVACY, AND THE NEW DIGITAL SERFDOM 148 (2017) [hereinafter FAIRFIELD, OWNED] (“Rivalrousness means that if I have a thing, you don’t.”).

other, but not unique. A baseball signed by Mike Trout would be unique and rivalrous if it is the only baseball he ever signed.

Humans value uniqueness and scarcity both economically and sentimentally. Economically, the scarcer an item is, the more we are willing to pay for it.<sup>13</sup> For example, an Action Comics No. 1 sold in 2014 for over three million dollars.<sup>14</sup> If everyone had a copy of that few pieces of stapled-together paper, the value would be nothing. Sentimentally, people attach value to unique objects based on that object's personal history.<sup>15</sup> A golden ring, once one of many in a store, becomes a symbol of a marriage. Those things become unique to us, non-fungible, not like the others. It is important to know which object is which. What spouse would not be devastated if their wedding ring were thrown into a box of identical rings, and they were told to pick one out?

People value and surround themselves with objects to which they attach their lives and experiences. Keychains and tee shirts memorialize family vacations. Mint condition vinyl records represent years of memories and collecting. Humans innately seek to store value from their life in these objects. Consistent with the digital shift, the way we do that has changed dramatically.<sup>16</sup> As an example: ask someone in two different decades what they would save from their house if it were burning down. In the 1950s someone might say a photo album. In the 2020s, someone is much more likely to say their phone or laptop. All the sentimental and personal value that people used to store in the objects around them is now stored inside of digital devices or in the cloud. Photo albums become photo apps. Letter exchanges become text messages.

While this digital shift has been building for some time, the rivalrousness and uniqueness that gives value to items in physical space has been hard to reproduce online. Every image online can be copied by right-clicking on it and saving the file. Every file sent is sent by making a copy. The kind of value we attach to our unique homes, works of art, collectible trading cards, and even personal data has gone entirely unrealized in a digital environment where copying is the breath of connectivity. Although it is clear that people become deeply attached to digital assets—an avatar in a massively multiplayer online game, an island in *Animal*

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13. See *id.* at 149 (explaining by way of example that Martin Shkreli gladly purchased the Wu-Tang Clan's album, *Once Upon a Time in Shaolin*, for the exorbitant price of \$2 million precisely because the Wu-Tang Clan made the album a scarce resource by only auctioning off a single copy of the album).

14. Angela Watercutter, *World's Most Expensive Superman Comic Just Sold for \$3.2M on eBay*, WIRED (Aug. 25, 2014, 3:46 PM), <https://www.wired.com/2014/08/superman-comic-3-million-ebay/> [<https://perma.cc/J8GA-5KNS>].

15. See Margaret Jane Radin, *Property and Personhood*, 34 STAN. L. REV. 957, 961 (1982) ("It intuitively appears that there is such a thing as property for personhood because people become bound up with 'things.'").

16. See *United States v. Petix*, No. 15-CR-227A, 2016 WL 7017919, at \*5 (W.D.N.Y. Dec. 1, 2016) ("Like marbles, Beanie Babies™, or Pokémon™ trading cards, bitcoins have value exclusively to the extent that people at any given time choose privately to assign them value."); FAIRFIELD, OWNED, *supra* note 12, at 86 (noting that in this day and age, "it is entirely possible to build relationships and meaningful attachments to fully digital spaces and experiences").

*Crossing*, or the Facebook page of a deceased relative—technology and law have failed to develop systems for creating unique digital assets. That is now changing.

Decentralized cryptolegders—public, hack-resistant, decentralized lists of who owns what—provided the first step. The result was cryptocurrencies like bitcoin, which provided rivalrousness but not yet uniqueness.<sup>17</sup> If I own a bitcoin, you do not, and if I transfer it to you, I do not have access to it anymore. That is rivalrousness. But uniqueness was harder to come by. Each bitcoin is worth the same as any other bitcoin. It has, by and large, the same attributes as any other bitcoin. And there is nothing to emotionally attach to in a bitcoin, no difference in characteristics and meaning. Bitcoins are by and large the same. They are *fungible*.<sup>18</sup>

The creation of non-fungible—*unique*—digital assets is now on the edge of mainstream technological implementation. Imagine a digital game in which the players own rather than license the unique items they earn while playing the game.<sup>19</sup> Imagine a database for deeds to land that would permit anyone to transmit land ownership to anyone else with the bump of a smartphone.<sup>20</sup> Imagine a virtual baseball trading card game in which digital cards were truly unique and collectible, rather than infinitely duplicatable with an online copy and paste.<sup>21</sup> Consider the possibility of a truly unique digital artwork, owned by a single person, displayed in a virtual reality museum, and capable of being sold to another owner to realize the increase in value stemming from its rarity and beauty.<sup>22</sup> Such a world is imagined in fictional

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17. See Shahla Hazratjee, *Bitcoin: The Trade of Digital Signatures*, 41 T. MARSHALL L. REV. 55, 61–63 (2015) (detailing how Bitcoin is a “system whereby Coins are securely passed from one person to another” ultimately providing the current “holder of the Coin exclusive right to ownership of the Coin”).

18. See Finzer, *supra* note 1 (describing how currency is a type of fungible asset because it is inherently interchangeable and replaceable with other currency).

19. See, e.g., *What Does True Ownership Mean? Don't I Own Items in Other Games?*, GODS UNCHAINED, <https://support.godsunchained.com/hc/en-us/articles/1500006242742-What-does-true-ownership-mean-Don-t-I-own-items-in-other-games-> [https://perma.cc/62ES-G8UJ] (“[W]e’re changing this old practice to give players real ownership over the items they purchase or earn in games. This gives you the right to sell an item for ETH, use it in Gods Unchained or even take it into a different game.”).

20. See Joshua A.T. Fairfield, *BitProperty*, 88 S. CAL. L. REV. 805, 874 (2015) [hereinafter Fairfield, *BitProperty*] (advocating for the use of blockchain technologies as the foundation for digital and online ledgers to maintain “digital property, currency, county land records, mortgage interests, security interests, stock ownership, and much more”); Bitcoin Exchange News Team, *BitProperty – BTP ICO Revenue Generating Real Estate Platform?*, BITCOINEXCHANGEGUIDE (Sept. 4, 2017), <https://bitcoinexchangeguide.com/bitproperty/> [https://perma.cc/ASA4-JRAL] (identifying Bitproperty as a digital blockchain based marketplace which facilitates the online purchase and exchange of real estate investment trusts).

21. See MLBCHAMPIONS, <https://www.mlbcryptobaseball.com> [https://perma.cc/4MXQ-GS3P] [hereinafter MLBCHAMPIONS Homepage] (stating that MLB Champions, or MLB Crypto Baseball, is a blockchain based sports game that allows users to play with their very own crypto figures).

22. See *Frequently Asked Questions*, SUPERRARE, <https://superrare.com/about> [https://perma.cc/L328-KRF8] (writing that SuperRare is an online marketplace to collect and trade unique single editions of digitally created artwork).

works like *Ready Player One* in which characters own such items as the “Orb of Osuvox” and use them to compete in a contest for the control of a virtual world.<sup>23</sup> As is often the case, science is doing the hard work of turning science fiction into reality.

This Article discusses the emerging law and technology of non-fungible tokens: a way of creating unique digital assets that can be bought and sold like real-world objects. NFTs are not like previous cryptocurrencies, where one coin is much the same as another. Non-fungible tokens can be used to create digital artwork that can be bought, sold, and owned like a physical sculpture, or a database of real estate in which ownership is managed by electronic deeds that can be passed from one person to another with low or no transaction costs. Digital item sales called microtransactions already drive the videogame economy, from the sale of hats in games like *Team Fortress* or *Among Us* to the purchase of special vehicles, weapons, and armor in first-person shooters or massively multiplayer virtual worlds.<sup>24</sup> Permitting gamers to truly own and resell what they buy or earn from the game creates a new incentive structure for hardcore players, who may be able to earn a living playing their favorite game.<sup>25</sup>

NFTs are rapidly becoming mainstream, and the demand for the technology stands in stark contrast to the legal regime that governs them. Our rules were intended for an older digital economy focused on licenses rather than sales of digital goods. The struggle of NFTs to find a legal climate conducive to what they offer—full, real, digital ownership—reflects a deeper struggle to shift our legal framework to handle new technological possibilities.<sup>26</sup> In particular, the past twenty years have given birth to an unprecedented expansion of intellectual property rights, which companies leverage into control over personal property owners. Ask owners of a new Oculus Quest headset: if they buy games on the headset and ever delete their Facebook account (or even if the Facebook algorithm finds they are insufficiently “active” on their account), they forever lose games fully bought and paid for.<sup>27</sup> That expansion of intellectual property rights was accompanied by an unprecedented expansion of

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23. See ERNEST CLINE, *READY PLAYER ONE* 309 (2011).

24. See Tonya M. Evans, *Cryptokitties, Cryptography, and Copyright*, 47 AIPLA Q.J. 219, 220–21 (2019) (“Presently, for example, if a user crafts a digital sword in the popular video game *MineCraft* or a creative skin in *Fortnite*, she cannot transfer that digital good into another platform, at least not without the platform’s acquiescence based on its contractual terms of use and licensing structure.”).

25. See GREG LASTOWKA, *VIRTUAL JUSTICE: THE NEW LAWS OF ONLINE WORLDS* 125 (2010) (“And because property is more meaningful and valuable to its owners when it can be gifted, sold, and traded, virtual worlds owners have incentives to create virtual economies to please users, allowing them to use property to create and sustain social bonds.”).

26. See FAIRFIELD, *OWNED*, *supra* note 12, at 208 (noting that the deficiencies which have and continue to plague the legal framework governing digital and smart property rights has led to an environment under which “we are in serious danger of being treated as digital tenants on our own software enhanced devices”).

27. See Gabe Gurwin, *Don’t Delete Facebook or You’ll Lose All Oculus Games for Good*, GAMESPOT (Oct. 26, 2020, 8:53 PM), <https://www.gamespot.com/articles/dont-delete-facebook-or-youll-lose-all-oculus-games-for-good/1100-6483716/> [https://perma.cc/E8CW-XTR8] (“You’re required to link a Facebook account when using the Oculus Quest 2 headset, and if your Facebook account isn’t in good standing, you will not be able to use the Quest 2 at all.”).

circumstances in which a court finds a minor, meaningless, technical act (such as surfing to a website) to constitute grounds for having accepted a contract, usually one in which a consumer cedes their rights by agreeing to arbitration.<sup>28</sup> The expansion of intellectual property rights online helped tame rampant piracy early in the internet's development, but it now offers an inadequate foundation as NFTs and digital uniqueness enter the scene.<sup>29</sup>

Given the rapidly expanding importance of NFTs, lawyers must develop a stable way of characterizing and protecting these interests. This piece aims to lay bare the foundational problems in the legal regime surrounding NFTs, with the goal of permitting the technology (and its adopters) to benefit from strong and simple personal property interests when they buy or sell NFTs. The remainder of this Article proceeds in three Parts. Part I describes the technology, market logic, and applications of NFTs, as well as some technical difficulties the technology faces in delivering true digital ownership. Part II examines the existing legal literature and law that courts will most likely apply to disputes between buyers and sellers of NFTs. Without a developed characterization of NFTs as digital personal property, NFT vendors using intellectual property licenses will be able to claw back key rights from NFT purchasers, just as, for example, Amazon Kindle denies that Kindle e-book purchasers truly own their purchases.<sup>30</sup> In response, Part III proposes an alternative and more natural characterization for the law of buying and selling NFTs. NFTs are billed as personal property, and the central transactional form for NFTs is a sale. Thus, this Article argues that the law of sales of personal property—Article 2 of the Uniform Commercial Code—offers powerful and flexible statutes for the formation, enforcement, and remedies for NFT sales, a deep field of case law that can help some sorts of thorny issues facing NFT markets, and analogies that courts can draw on to resolve emerging questions of the proper legal characterization of the technology. Part IV concludes.

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28. See Margaret Jane Radin, *Humans, Computers, and Binding Commitment*, 75 IND. L.J. 1125, 1128–29 (2000) (defining a click-wrap agreement as a contract which is formed after an internet user clicks “I agree” or proceeds to the site when presented with a website’s terms and conditions of use); *Nguyen v. Barnes & Noble Inc.*, 763 F.3d 1171, 1175–76 (9th Cir. 2014) (“Contracts formed on the Internet come primarily in two flavors: ‘clickwrap’ (or ‘click-through’) agreements, in which website users are required to click on an ‘I agree’ box after being presented with a list of terms and conditions of use; and ‘browsewrap’ agreements, where a website’s terms and conditions of use are generally posted on the website via hyperlink at the bottom of the screen.”).

29. See Bryan Wilson, *Blockchain and the Law of the Cat: What Cryptokitties Might Teach*, 88 UMKC L. REV. 365, 369 (2019) (presenting how CryptoKitties, as one of the first blockchain based games, demonstrated how progress under the third generation of the World Wide Web, or Web 3.0 “will be won through, not just smarts, but also through creativity and design”).

30. Joel Johnson, *You Don’t Own Your Kindle Books, Amazon Reminds Customer*, NBC NEWS (Oct. 24, 2012, 10:43 AM), <https://www.nbcnews.com/technology/you-dont-own-your-kindle-books-amazon-reminds-customer-1C6626211> [https://perma.cc/GG57-F2PA]; see also Brad Stone, *Amazon Erases Orwell Books from Kindle*, N.Y. TIMES (July 17, 2009), <https://www.nytimes.com/2009/07/18/technology/companies/18amazon.html> [https://perma.cc/H7LX-P92S].



## I. CREATING DIGITAL UNIQUENESS

At the beginning of the internet, there was no way to sell digital assets without risking rampant copying.<sup>31</sup> Courts vastly expanded copyright law and liability in response.<sup>32</sup> Now, the technology to create unique digital assets exists, but the legal framework has already strayed far in the direction of governing all such transactions through overreaching copyright law.<sup>33</sup> To return digital markets in personal property to balance will require an understanding of both the technology and its surrounding legal context. This Section describes the technology underlying NFTs, several of the leading applications, and some of the problems that stand in the way of the promise of the technology.

At its core, the problem is simple: offline, the transaction of selling an object to someone else is so unremarkable that we often do not consider the significant amount of law that goes into determining who can do what with assets that they purchase and own. We only begin to understand the law underlying personal property ownership when it fades—when we realize that online, we do not own the things we have bought and fully paid for from Google, Apple, or Amazon. The entire project of NFTs is a technological attempt to recreate a simple sales transaction, but for a unique digital asset instead of a physical object. To do so, it is necessary first to understand how NFTs work and why they differ from first-generation cryptocurrencies, and second to understand some of the ways in which NFTs must change in order to offer the kind of untrammled personal property interest in digital assets that developers and sellers promise.

*A. Evolving Blockchain and NFT Technology*

Scholars have written on the technology of blockchain and distributed public ledgers at some length.<sup>34</sup> Rather than repeat that scholarship here, I will establish the

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31. See *A&M Recs., Inc. v. Napster, Inc.*, 239 F.3d 1004, 1018 (9th Cir. 2001) (stating that the widespread copying of music on Napster had an adverse effect on the market for music). In particular, Digital Rights Management (DRM) failed. DRM schemes were hacked as quickly as they were produced.

32. See, e.g., *N.Y. Times Co. v. Tasini*, 533 U.S. 483 (2001); *Religious Tech. Ctr. v. Netcom On-Line Comm'n Servs., Inc.*, 907 F. Supp. 1361, 1365 (N.D. Cal. 1995) (ruling that an internet service provider that “allows [a computer bulletin board service] to reach the Internet” may be liable for copyright infringement committed by a subscriber of the bulletin board service).

33. See *Triad Sys. Corp. v. Se. Express Co.*, 64 F.3d 1330 (9th Cir. 1995); *MAI Sys. Corp. v. Peak Comput., Inc.*, 991 F.2d 511 (9th Cir. 1993); *Advanced Comput. Servs. of Mich., Inc. v. MAI Sys. Corp.*, 845 F. Supp. 356 (E.D. Va. 1994).

34. See generally Aaron Wright & Primavera De Filippi, *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* (Mar. 10, 2015), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2580664](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664) [<https://perma.cc/2BFS-EBW7>]; Paul H. Farmer, Jr., *Speculative Tech: The Bitcoin Legal Quagmire and the Need for Legal Innovation*, 9 J. BUS. & TECH. L. 85 (2014); Jordan L. Ludwig, Note, *Protections for Virtual Property: A Modern Restitutionary Approach*, 32 LOY. L.A. ENT. L. REV. 1 (2012); Reuben Grinberg, *Bitcoin: An Innovative Alternative Digital Currency*, 4 HASTINGS SCI. & TECH. L.J. 159 (2012); Stephen T. Middlebrook & Sarah Jane Hughes, *Regulating Cryptocurrencies in the United States:*

elements of blockchain technology relevant to this Article's discussion, before moving to a more detailed description of the technological basis for digital uniqueness.<sup>35</sup>

Distributed ledgers, commonly called blockchains, are databases that no one entity controls, but that anyone can write to.<sup>36</sup> In the case of many blockchains, the database is a list of who owns what—who owns which bitcoins, for example.<sup>37</sup> The immediate problem of letting anyone write to the database is fraud. What if person A decides to pay B one unit, but then write to the database that she has retained that unit?<sup>38</sup> Blockchains use a consensus mechanism to make it either too much work (proof-of-work systems) or too risky (proof-of-stake systems) to attempt to falsify the ledger.<sup>39</sup> This is addressed by a mathematical relationship called a hash, and a consensus mechanism for verifying hashes.<sup>40</sup> A hash is a one-way mathematical relationship whereby an input generates a unique alphanumeric string of limited

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*Current Issues and Future Directions*, 40 WM. MITCHELL L. REV. 813 (2014).

35. For anyone wanting an extraordinarily good and relatable introduction to the technology, I suggest Dan Finlay, *Dan's Intro to How Ethereum Works*, YOUTUBE (Feb. 16, 2017), <https://www.youtube.com/watch?v=-SMliFtoPn8> [<https://perma.cc/9WMF-BDCJ>].

36. See Wright & De Filippi, *supra* note 34, at 2 (“The blockchain is a distributed, shared, encrypted-database that serves as an irreversible and incorruptible public repository of information. It enables, for the first time, unrelated people to reach consensus on the occurrence of a particular transaction or event without the need for a controlling authority.”); Fairfield, *BitProperty*, *supra* note 20, at 808 (arguing that blockchain technology “represents a significant advance in tracking information about who owns what . . . through a distributed public ledger that does not require trust in other parties or in a central list authority, and is robustly resistant to falsification”); Farmer, *supra* note 34, at 88–89 (“The full record of transactions is called a block chain, a sequence of records composing a virtual ledger.”).

37. See Fairfield, *BitProperty*, *supra* note 20, at 808 (stating that blockchain technology facilitates the creation of a public database which tracks “who owns what”); Farmer, *supra* note 34, at 89 (describing how Bitcoin utilized its blockchain sequence to create a virtual public ledger which “allows records to be kept” reflecting who owns which bitcoins).

38. See Nikolei M. Kaplanov, *Nerdy Money: Bitcoin, the Private Digital Currency, and the Case Against Its Regulation*, 25 LOY. CONSUMER L. REV. 111, 116 (2012) (“[I]t may be difficult to prevent the same user from double spending the same digital coins by copying them.”).

39. See Wright & De Filippi, *supra* note 34, at 6 (stating that blockchain uses a probabilistic approach which makes it too much work for “potential attackers to corrupt a shared database with false information, unless the attacker owns a majority of the computational power of the entire network”); Evans, *supra* note 24, at 237 (describing the difference between proof-of-work which is based on mining and proof-of-stake which is based on consensus); BITFURY GROUP, PROOF OF STAKE VERSUS PROOF OF WORK 2 (2015), <https://bitfury.com/content/downloads/pos-vs-pow-1.0.2.pdf> [<https://perma.cc/TGA4-7QDL>] (“The idea behind proof of stake is simple: instead of mining power, the probability to create a block and receive the associated reward is proportional to a user’s ownership stake in the system.”).

40. See Rebecca M. Bratspies, *Cryptocurrency and the Myth of the Trustless Transaction*, 25 MICH. TECH. L. REV. 1, 12–13 (2018) (“[P]roof of work involves encrypting new transaction requests, along with information about the preceding block in the form of a 16-digit number called a ‘hash’ that must be no greater than a target value.”).

length.<sup>41</sup> Anything can be hashed: a picture, the entire text of the *Encyclopaedia Britannica*, or in the case of blockchains, a list of transactions showing who owns what.<sup>42</sup> The key element to a hash is that if any part of the input is changed, the hash changes, revealing that a fraudster has attempted to alter some piece of data.

A group of transactions can be recorded in what is called a block.<sup>43</sup> New blocks are created through a process of “mining” in which different computers compete to solve a complicated math problem, and the computer that wins is rewarded the block.<sup>44</sup> All of the transactions are recorded on that block and the block is closed and hashed, creating a unique identifying number.<sup>45</sup> That number forms the basis for the next math problem that the miners then try to solve.<sup>46</sup> Each block in the chain is mathematically linked to the block right before and right after it.<sup>47</sup> When a new block is added, it is hashed together with the previous block’s hash.<sup>48</sup> Altering one block would mean that you have to alter every block that came before it.<sup>49</sup> The connectedness of the entire chain protects the blockchain from fraud and censorship.<sup>50</sup>

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41. See *id.* at 13 (“The block’s hash serves as a digital fingerprint for the encrypted data, and a means to verify that the data has not been altered. That means that once a block is created, it can only be changed by redoing the entire calculation.”). You can see how a hash works here: XORBIN, <https://xorbin.com/tools/sha256-hash-calculator> [<https://perma.cc/RL7J-599B>]. Try putting anything into the input box and notice the hashes that come out. If you alter the input at all, the hash will change.

42. See Evans, *supra* note 24, at 239 (explaining blockchain hashing as “the process by which a grouping of digital data is converted into a single ‘number’” whereby the hash serves as a record of ownership by creating a “unique identifier of the source data or a digital fingerprint of the source data that cannot be altered”).

43. See Bennett Garner, *Merkle Tree Hashing: How Blockchain Verification Works*, COINCENTRAL (Sept. 3, 2018), <https://coincentral.com/merkle-tree-hashing-blockchain> [<https://perma.cc/YN2C-7ZZF>] (writing that in a bitcoin blockchain, a block of transactions runs through an algorithm to generate a hash which can then be used to verify “the contents of the block and consistency of multiple ledgers”).

44. See *id.* (noting that this process allows multiple computers to keep copies of the same database or ledger to “verify individual records without having to review and compare versions of the entire database”).

45. See Bratspies, *supra* note 40, at 13 (“The block’s hash serves as a digital fingerprint for the encrypted data, and a means to verify that the data has not been altered. That means that once a block is created, it can only be changed by redoing the entire calculation.”).

46. See Garner, *supra* note 43 (detailing how each blockchain sequence builds upon preceding chains).

47. See *id.* (noting that each transaction added to the blockchain becomes linked with the blocks preceding and following the chain).

48. See *id.* (“When that transaction is added to the blockchain, it becomes part of a block with other transactions.”).

49. See Bratspies, *supra* note 40, at 13 (“That means that once a block is created, it can only be changed by redoing the entire calculation. And, as new, later blocks are chained to it, anyone seeking to alter a particular block, say to remove an included transaction, would also have to redo all the subsequent blocks.”).

50. See Wright & De Filippi, *supra* note 34, at 6 n.20 (“The blockchain represents majority consensus through the longest block chain. To succeed in a malicious attack, a fraudulent node would have to redo all the work of the target block plus all the work of the

Think of the blockchain like a book of transactions or a ledger. A new page is added to the book and people are able to write their transaction onto the new page. Since everyone is able to access the book, we might be worried that someone would come along and tear a page out, add a new page, or erase and alter a transaction from an earlier page in the book.<sup>51</sup> Blockchain solves those problems. You know that a page is missing if the book goes from page two to page four without page three. You know a page is added if there are additional pages or more than one page seven. Each page is made impossible to alter by laminating and sealing each page. The blockchain provides similar protections for each information and transaction in virtual space by allowing each person to maintain a copy of the book and constantly checking each copy against one another.

A blockchain is a database that remembers state,<sup>52</sup> and thus can itself serve as a database of anything, including another layer of executable code. In the next iteration of the technology, other applications, called distributed apps (“dapps”), can then be programmed to run on a blockchain.<sup>53</sup> Ethereum is a good example. Think of the Ethereum blockchain as a large, decentralized computer. Each app runs on that computer.<sup>54</sup> Every computation on Ethereum requires some computing power from that distributed computer to run the transaction.<sup>55</sup> That processing power is paid for

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following blocks and surpass the work of the honest nodes.” (citing Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System 3 (2008), <https://bitcoin.org/bitcoin.pdf>); see also Garner, *supra* note 43 (describing how hashing utilizes an algorithm which produces an unreplicable output from the valid transactions recorded in each blockchain such that any alteration to the source data is detected as fraudulent conduct because “[e]ven a small change in the input avalanches to a drastic change in the output”).

51. See Fairfield, *BitProperty*, *supra* note 20, at 820 (“A commonly used analogy is that of a letterbox. The public key is the address of the letterbox. Anyone can put a letter in. But only the owner of the letterbox has the key to open it and retrieve the contents.”).

52. A computer remembers state if it recalls previous events and user interactions. A drawing in the sand that is washed away in the waves does not store state, whereas carvings in a rock do. The important point is not that the state is permanent (although in a blockchain it is, due to hashing), but rather that the computer can remember what has gone before and apply what is happening now.

53. See Nathaniel Popper, *Understanding Ethereum, Bitcoin’s Virtual Cousin*, N.Y. TIMES (Oct. 1, 2017), <https://www.nytimes.com/2017/10/01/technology/what-is-ethereum.html> [<https://perma.cc/66N5-JWBU>] (“The shared records of the Ethereum network—of every transaction and computation it has ever performed—are known as a blockchain, just as the shared records of all Bitcoin transactions are known as a blockchain.”).

54. See Vitalik Buterin, *Ethereum Whitepaper*, ETHEREUM, <https://ethereum.org/en/whitepaper/#a-next-generation-smart-contract-and-decentralized-application-platform> [<https://perma.cc/F92B-VHW4>] (last updated Feb. 18, 2022) (describing Ethereum as a platform for users to build and run decentralized applications through Ethereum’s blockchain which allows “anyone to write smart contracts and decentralized applications where they can create their own arbitrary rules for ownership, transaction formats and state transition functions”).

55. See Jake Frankenfield, *Gas (Ethereum)*, INVESTOPEDIA, <https://www.investopedia.com/terms/g/gas-ethereum.asp> [<https://perma.cc/78FF-HTVN>] (last updated May 26, 2021) (“Gas refers to the fee, or pricing value, required to successfully conduct a transaction or execute a contract on the Ethereum blockchain platform.”).

with ether.<sup>56</sup> Users must expend some ether for every transaction they run, known as a “gas fee.” Ether is burned to generate “gas” which pays the individual people who maintain the Ethereum Virtual Machine on their computers.<sup>57</sup>

These distributed apps can in turn create their own token systems by initiating a smart contract (a program) that acts as its own registry, determining how many tokens exist, and who owns what—it’s like running an Excel spreadsheet in Google Drive, a database running on a database.<sup>58</sup> These tokens consist of a hash of the token’s transaction history, a series of basic standard functions and features, like the transfer function, and functions for determining the number and type of tokens in an owner’s wallet, or (in the case of NFTs) a URL to find a file related to the token—the artwork the token represents, for example, and a hash of the artwork as proof.<sup>59</sup>

The most commonly used standard to make NFTs, and that of most interest to this paper, is ERC-721.<sup>60</sup> ERC-721 produces tokens that are quite different from one another, of different worth, with different characteristics, and tied to assets with different values. The value of using a common protocol is that third-party developers can write programs that interact with it, creating greater interoperability. One token might represent the virtual equivalent of ownership of Boardwalk or Park Place, others could represent Mediterranean or Baltic Avenue. Gains or loss in value of one NFT does not imply a gain or loss in the value of any other token. If an NFT tied to a digital equivalent of the Mona Lisa were to rise in value, a different NFT tied to the digital equivalent of my attempt to paint a landscape with Bob Ross’s happy little trees would not.

Often, an NFT stands for ownership of something not directly stored on the blockchain—a piece of digital art, for example. So a token representing digital art might contain a URL pointing to the art and a hash of the art file. In this way, an NFT might convey an ownership interest in a piece of digital art, an asset in an online

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56. See *Terms of Use*, AXIE INFINITY, <https://axieinfinity.com/terms> [<https://perma.cc/Z2CR-KMKN>] (last updated Feb. 15, 2022) [hereinafter AXIE Terms of Use] (stating that Ethereum mandates it receives a fraction of proceeds from all transactions known as a “Gas Fee” to fund “the network of computers that run the decentralized Ethereum network”); Buterin, *supra* note 54.

57. See AXIE Terms of Use, *supra* note 56 (“Ethereum requires the payment of a transaction fee (a ‘Gas Fee’) for every transaction that occurs on the Ethereum network. The Gas Fee funds the network of computers that run the decentralized Ethereum network. This means that you will need to pay a Gas Fee for each transaction that occurs via the App.”).

58. See Buterin, *supra* note 54 (“What Ethereum intends to provide is a blockchain with a built-in fully fledged Turing-complete programming language that can be used to create ‘contracts’ that can be used to encode arbitrary state transition functions, allowing users to create any of the systems described above, as well as many others that we have not yet imagined, simply by writing up the logic in a few lines of code.”).

59. See Finzer, *supra* note 1 (“By representing non-fungible tokens on public blockchains, developers can build common, reusable, inheritable standards relevant to all non-fungible tokens. These include such basic primitives as ownership, transfer, and simple access control.”).

60. See *ERC721 Tokens (Non-Fungible Tokens) Explained*, DISTRICT0X EDUC. PORTAL, <https://education.district0x.io/general-topics/understanding-ethereum/erc-721-tokens/> [<https://perma.cc/53KX-AFY7>] (“ERC721 is a standard interface for Non-Fungible tokens, meaning ERC721 tokens are simply a subset of Ethereum tokens.”).

game, a card in a collectible trading card game (think rare baseball cards here), or a plot of land in a virtual world. Or, a token might convey rights in a real-world asset, in an RFID-linked consumer good, or a car that only unlocks and drives for the token owner.<sup>61</sup>

### B. NFT Examples

The technology only makes NFTs possible. The other side of the value proposition is which NFTs people purchase and why. This Section briefly touches on some of the more successful or innovative NFT implementations.

The primary application of NFTs has been art, collectibles, and gaming, which will be discussed further down in this Section. Other than those spaces, NFT and blockchain technology has many potential future uses. Amazon, Microsoft, and JPMorgan all have moved into the blockchain space as part of a prior wave of adoptions of mainstream blockchain technology.<sup>62</sup> Amazon in particular would serve as the grail of NFT adoption. Its platform has always been more heavily focused on delivering personal property than licensing intellectual property. eBay is another internet giant that would benefit immeasurably from creating, promoting, and providing a marketplace for NFTs. After all, eBay focuses on the resale, rather than the original sale, for its central business model. NFTs delivered over eBay would generate profit for the company time and again as they were sold and resold through eBay's marketplace. And, both Amazon and eBay have the payments infrastructure to handle the purchase of NFTs with credit cards, the lack of which ability is a massive barrier to widespread adoption of NFT purchasing and collecting. And future applications of the technology, from creating a token system allowing the cost-free exchange of real estate title (with no need for title searches, since the chain of title could be cryptographically secured and rendered unfalsifiable) to voting (where each vote would be a unique token, fully identifiable to the voter and verifiable as accurately cast, essentially an NFT system where transfers are only permitted to the entity approved to receive and count votes) will open in the next few years.

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61. See, e.g., *How Blockchain Is Making Car Ownership Easier*, VINCHAIN (Feb. 13, 2019), <https://vinchain.io/blog/how-blockchain-is-making-car-ownership-easier/296> [<https://perma.cc/2GUG-RAER>] (“Once a purchase or lease agreement has been signed, a smart contract can be created to allow only certain drivers access to the vehicle on cars with automated entry systems.”); Molly Schuetz, *Startup Codex Brings Blockchain to Art with Backing from Pantera*, BLOOMBERG (Feb. 28, 2018, 5:00 AM), <https://www.bloomberg.com/news/features/2018-02-28/startup-codex-brings-blockchain-to-art-with-backing-from-pantera> [<https://perma.cc/3XWU-J2YF>] (“Codex has developed a decentralized database for the market for art and collectibles like antique cars and jewelry. This protocol would help bring transparency to one of the most valuable aspects of any item in that category: its provenance.”).

62. See Michael del Castillo, *Blockchain Goes to Work at Walmart, Amazon, JPMorgan, Cargill and 46 Other Enterprises*, FORBES (Apr. 16, 2019, 6:00 AM), <https://www.forbes.com/sites/michaeldelcastillo/2019/04/16/blockchain-goes-to-work/?sh=2661ea132a40> [<https://perma.cc/W5PH-2Z8T>] (“[C]orporations are embracing the technology underlying cryptocurrencies like bitcoin and using it to speed up business processes, increase transparency and potentially save billions of dollars.”).

Digital art was one of the first applications of NFT technology. Much of what motivates the sale of physical art—the ability to display the piece, or profit from a unique piece’s rise in value upon resale—has not been possible in digital space. NFTs now allow for ownership in digital art to be proven and for the owner to use their token in various online social spaces.<sup>63</sup> Two examples of virtual social displays beyond the world of NFTs may help to explain the motivation to buy digital art. The first example is character skins in a video game. From World of Warcraft to Fortnite and Call of Duty, games have allowed players to alter the physical appearance of their character without altering any of the characters’ underlying stats or playability.<sup>64</sup> The goal is simply to display to other players that you have a certain skin: the more unique or scarce, the better. A second example from social media such as Instagram is the display of likes on a post. The legitimacy of likes is often called into question as people use bots to artificially increase their numbers.<sup>65</sup> Similarly, skins in a video game could be the result of cheating rather than actually earning the skin.<sup>66</sup> NFTs would allow for these digital displays to be tokenized and verified with the blockchain. The desire to display motivates people to buy digital NFT art just as the desire for recognition motivates displays on social media or in a video game.

Consider Rarible, a marketplace for unique digital art. To use the site, an artist creates a work. They then tokenize copies of the artwork, assigning each to a unique NFT. Creators transfer NFTs through the marketplace to collectors, who can in turn transfer the tokens further to other interested buyers as the digital assets rise in value. Because they are tokenized, the digital artworks are limited in number, and the smart contract governing token ownership cannot itself be altered once hashed to the blockchain.<sup>67</sup> Rarible recreates a central aspect of the physical art world in the digital

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63. See *Frequently Asked Questions*, SUPERRARE, <https://superrare.co/about> [<https://perma.cc/6LEQ-WBNM>] (“Each artwork on SuperRare is a digital collectible—a digital object secured by cryptography and tracked on the blockchain. That’s just a fancy way of saying they’re provably scarce items that can be collected, and that hold value like cryptocurrencies like ether and bitcoin.”); *Meet Rarible*, RARIBLE, <https://rarible.com/how-it-works> [<https://perma.cc/CN7R-LR6K>] (stating that Rarible is an NFT marketplace which facilitates the sale of digital artwork through Ethereum’s blockchain).

64. See Ruchir Sharma, *Opinion, People Aren’t Reading or Watching Movies. They’re Gaming.*, N.Y. TIMES (Aug. 15, 2020), <https://www.nytimes.com/2020/08/15/opinion/fornite-epic-apple-gaming.html> [<https://perma.cc/7KM2-D4KN>] (writing how Fortnite allows users to purchase virtual accessories which alter their character’s physical appearance including “equipment, outfits (‘skins’), dance moves, even branded merchandise from outside vendors like the National Football League”).

65. See Sapna Maheshwari, *How Bots Are Inflating Instagram Egos*, N.Y. TIMES (June 6, 2017), <https://www.nytimes.com/2017/06/06/business/media/instagram-bots.html> [<https://perma.cc/US9M-V62F>] (stating that some social media influencers on Instagram use bots “to increase their numbers so brands will work with them”).

66. See Davey Winder, *Fortnite Hackers Earn \$1 Million A Year—Stealing Your Skins*, FORBES (Aug. 27, 2020, 6:09 AM), <https://www.forbes.com/sites/daveywinder/2020/08/27/heres-how-fortnite-hackers-make-1-million-a-year-epic-games-passwords/?sh=78ae9e535d42> [<https://perma.cc/FWQ8-4JV6>] (describing how some hackers make upward of \$25,000 a week from stealing character skins earned or purchased in game by Fortnite players).

67. See *Rarible.com FAQ*, NOTION, <https://www.notion.so/rarible-com-FAQ->

space—the ability to capture the rise in value of a piece of art. Prior to NFTs and marketplaces like Rarible, people were unable to effectively trade in decentralized digital assets. Rarible creates a marketplace that not only has led to a burgeoning trade in NFTs as buyers sell their purchases forward, but also allows content creators to make money from downstream sales of their products.<sup>68</sup> Such an incentive, while unusual in the realm of IP, may lead to an increase in artists adopting the platform in the early stages of NFT development.

Another digital art marketplace, SuperRare, stores a hash of the digital art piece directly in the token on the smart contract.<sup>69</sup> Other digital art marketplaces keep the art stored in a file that exists off the Ethereum blockchain, and the token keeps a record of who owns that file. With SuperRare, the art is in the token itself, so when someone buys a token, the art will continue to exist even after someone has stopped maintaining the external server. SuperRare has also focused more heavily on developing a social context for the owned items by creating a digital art social media space rather than simply a marketplace.<sup>70</sup> As their website indicates, “collecting is inherently social,” and part of the value of owning art is having the ability to display it in a collection or gallery.<sup>71</sup> Thus, SuperRare creates the ability to share an art collection on the website and in virtual reality galleries.<sup>72</sup>

A distinct application of NFTs, although not dissimilar from digital art, is NFT collectibles. Collectibles are more like Beanie Babies than Picassos. While both involve a mix of token and intellectual property, collectibles are valuable because of the social context—a game, a narrative, a shared experience—of which they are a part. The value of collectibles comes in the collecting and trading of the items in addition to displaying and selling. Two valuable lines of NFT collectibles, CryptoKitties and Axies, became extremely popular and valuable when NFT technology first took off, and the success of these two brands represents not only the excitement around NFTs but also the promise of future application.<sup>73</sup>

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a47b276aa1994f7c8e3bc96d700717c5 [https://perma.cc/974S-93AN] (“As an artist, by tokenizing your work you both ensure that it is unique and brand it as your work. The actual ownership is blockchain-managed.”).

68. See Rarible, *Introducing \$RARI — the First Governance Token in the NFT Space*, MEDIUM (July 15, 2020), <https://rarible.medium.com/introducing-rari-the-first-governance-token-in-the-nft-space-5dbcc55b6c43> [https://perma.cc/QV88-3QER] (supplying artists with \$RARI, Rarible’s digital currency token, for the sale of his or her digital artwork in Rarible’s virtual marketplace).

69. See *Frequently Asked Questions*, SUPERRARE, <https://superrare.co/about> [https://perma.cc/3TZJ-KYJ7] (“Each artwork is authentically created by an artist in the network, and tokenized as a crypto-collectible digital item that you can own and trade.”).

70. See *id.* (“Since digital collectibles have a transparent record of ownership, they’re perfect for a social environment. The social layer can make it easier to assess value and other context around items in the marketplace. Also, it’s more fun!”).

71. *Id.*

72. See *id.* (detailing that SuperRare is a digital marketplace to collect, showcase, trade, buy, and sell “unique, single-edition digital artworks”).

73. See Finzer, *supra* note 1 (explaining how CryptoKitties “was the first project to take NFTs to the mainstream” in late 2017 and that CryptoKitties’ success ushered in a technological renaissance in “early 2018 as investors and entrepreneurs started to think about a new way to own digital stuff”).



CryptoKitties, a collectibles fad that sold millions of dollars' worth of NFTs beginning in 2017, were the breakout success story for NFT technology.<sup>74</sup> "Kitties" are pictures of cats tied to a particular ERC-721 token. Ownership of the tokens was determined by a smart contract. When an owner wanted to sell a kitty, the token was traded from one wallet to another, and the ownership interest recorded by the smart contract. As is usually the case with cryptocurrencies and NFTs, the value of the CryptoKitty was in the system: other people wanted them, either to breed (creating new CryptoKitties with new characteristics) or to sell. Some kitties were sold for high amounts of money, although it is not clear that the sales prices represented actual valuations as much as a way of surreptitiously moving cash.<sup>75</sup> In either case, CryptoKitties captured people's attention and imagination because of the ability to breed, trade, and play with the virtual cats in a rich online community.<sup>76</sup> CryptoKitties took the first step into an entirely new marketplace that will pave the way for more mainstream applications.

Following in the footsteps of CryptoKitties, Axie Infinite expanded the application of collectible items into an even richer online gaming environment. On Axie, users can buy and breed Axies, which look like little monsters.<sup>77</sup> Each monster can then be used in adventure- or arena-style gameplay with or against other players.<sup>78</sup> Axie does more than customizable skins for characters and actually allows players to create a fully unique character. Think of an MMORPG<sup>79</sup> version of *Pokémon*, except every monster is different. On Axie, players are able to make money by selling their Axies, land in game, and collectible items. Players have engaged in transactions in ETH with a value equivalent to 39 million USD on the Axie marketplace with the most expensive Axie selling for 300 ETH (at the time, over 100,000 USD).<sup>80</sup>

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74. See Evans, *supra* note 24, at 250 ("Cryptokitties, the first blockchain project to utilize the ERC-721 standard successfully, is an Ethereum-based digital collectible gaming platform in which players can buy, sell, trade, and breed digital cats that the user actually owns. Cryptokitties became all the rage—and virtually crippled the Ethereum Network—at the end of 2017.").

75. See *id.* at 251 (writing that some CryptoKitties "have little to no value, although others are valued in the tens of thousands of dollars"); Neer Varshney, *Someone Paid \$170,000 for the Most Expensive CryptoKitty Ever*, NEXT WEB (Sept. 5, 2018), <https://thenextweb.com/hardfork/2018/09/05/most-expensive-cryptokitty/> [<https://perma.cc/DJ7E-VESA>] (reporting that one CryptoKitty named Dragon sold for approximately \$170,000 and noting, "there can be only speculations on what makes [Dragon] so precious. Perhaps the buyer and seller wanted to make a transaction anyway, so they traded this CryptoKitty? Some speculate it could be money laundering").

76. See Wilson, *supra* note 29, at 380 ("Cryptokitties helps educate users about the unique features of blockchain, like digital scarcity and smart contracts, by turning cats into data, in this case a set of cattributes, that are stored as a hash value on the Ethereum blockchain . . .").

77. See Axie Infinity, *Axie Community Alpha: Getting Started!*, LUNACIAN (Jan. 8, 2020) <https://axie.substack.com/p/axie-community-alpha-getting-started> [<https://perma.cc/39UA-ZAC7>] ("Axie Infinity is a digital pet universe where players battle, raise, and trade fantasy creatures called Axies!").

78. See *id.*

79. Massively Multiplayer Online Role-Playing Game.

80. See AXIE INFINITY, [axieinfinity.com/](http://axieinfinity.com/) [<https://perma.cc/76MJ-4R2V>].

An almost painfully obvious application of NFTs is in the digital trading card space. Everything that made *Magic: The Gathering* an international success translates seamlessly into an online platform. Another early adoption of NFT technology, *Gods Unchained*, is pioneering a new space in collectible card games. On the *Gods Unchained* platform, players can unlock cards by playing the game, then sell and trade the cards in an online marketplace.<sup>81</sup> In addition to the collectability of the cards, the cards have value due to their context within the game. Instead of storing cards in a box, cards are stored in a digital wallet and ownership is verified on the blockchain. Instead of pay-to-win, freemium-style games like *Farmville*, *Gods Unchained* is the first in what is likely to be a fruitful play-to-earn space of gaming. Players who are used to pouring thousands of dollars into their games will now be able to retain productive ownership over in-game items and see money return for their time put in.

NFTs have uses beyond digital assets as well. Zora, an NFT-enabled “Everything Exchange,” allows users to sell rare or unique items on their marketplace using tokens.<sup>82</sup> Every item is given an NFT, and users are able to buy, sell, and trade the tokens on the exchange.<sup>83</sup> Rather than being tied to a piece of digital art, the token is tied to a physical item. The token allows users on Zora to trade the item and capture its rise in value without ever having to ship the item. Once someone wants to buy the physical item, they can redeem the token and the physical item will be sent to them.<sup>84</sup> Further applications of NFTs to physical assets could allow for more efficient markets for heavily traded assets such as physical art, cars, and even land.

Following the success of brands that first rose alongside NFT technology, more traditional intellectual property rights holders have begun to follow suit. Major League Baseball, which has long been a behemoth in the collectibles space with trading cards, bobbleheads, and more, started an on-chain game called *MLB Champions*.<sup>85</sup> Users are able to collect baseball player bobbleheads and play them against other people in online baseball games.

Similar to MLB, the NBA has started tying memorable moments of basketball history to the blockchain. On *NBA Top Shot*, basketball fans can buy great plays from NBA games in the form of cubes that contain a brief highlight reel, the score of

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81. See GODS UNCHAINED, *Frequently Asked Questions*, <https://godsunchained.com/learn/faq> [<https://perma.cc/2P4W-AHBP>] (“In *Gods Unchained* players completely own their digital items, giving them the freedom to trade, sell and use their cards any way they like – just like owning real, tangible cards.”).

82. See Zora Team, *How to Buy and Sell on Zora*, ZORA (July 30, 2020), <https://blog.ourzora.com/home/how-to-buy-and-sell> [<https://perma.cc/GFG7-P2P5>] (“Zora is the Everything Exchange. It’s where anyone in the world can buy, sell and trade limited-edition goods and art.”).

83. See *id.* (“Zora utilizes cryptocurrencies—a paradigm shifting technology that gives anyone in the world the power to create, share and exchange value.”).

84. See Jeff John Roberts, *Hype Beasts, the ‘Yeezy’ Problem, and \$950 Cassette Tapes: How Crypto Startup Zora Is Helping Musicians Create New Revenue Streams*, FORTUNE (Sept. 27, 2020, 11:00 AM), <https://fortune.com/2020/09/27/zora-crypto-startup-music-business-revenue-streams-yeezy-hype-beasts/> [<https://perma.cc/AT84-B5MK>].

85. See MLB CHAMPIONS Homepage, *supra* note 21.

the game, other stats, and team logos.<sup>86</sup> Cubes have been consistently listed on the Top Shot Marketplace for over \$50,000.<sup>87</sup> Since launch, there have been over \$942 million in Top Shot sales.<sup>88</sup> NBA Top Shot has the additional advantage of being easy to set up and start trading. Users can log in with a Gmail account and pay directly with a linked credit card or use one of the many cryptocurrencies such as Bitcoin or Ethereum.<sup>89</sup> Top Shot creates a balance between people who want to operate exclusively in the crypto space and those who want to collect NBA moments but are unfamiliar with crypto and blockchain technology. The incorporation of traditional IP into the NFT market has successfully combined the innovative technology with the demand created by businesses like the MLB and NBA.

As other established IP giants start to turn their attention to the NFT collectible space, the use of the technology is likely to become more widespread. Imagine companies like Disney, Marvel, Hasbro, and more creating lines of NFT products that are tied to context-rich digital spaces. More people will begin trading and using NFTs and the blockchain without having to understand the finer technical details of the underlying technology. More companies are likely to follow in the footsteps of NBA Top Shot and create platforms that are appealing to NFT natives while still being easy to understand for the less tech savvy. While IP giants getting involved in the NFT space will certainly increase demand for NFTs, these companies are likely to take advantage of the same intellectual property regime that they have been using online for years before NFTs. Users will be able to “own the underlying NFT completely,” but will only possess a “non-exclusive, non-transferable, royalty-free license to use, copy, and display the Art.”<sup>90</sup> The restrictions posed by this intellectual property regime is discussed more fully in Section II.C below.

### *C. Technical Clawbacks of Digital Rights*

The value of NFTs rests on a simple value proposition: that a purchaser of an NFT owns it free and clear. The problem is that this proposition is not yet entirely true. There are two central difficulties, one addressed here, and one in the next Part. The first, addressed here, is that the technological implementation of NFTs leaves room

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86. See Tommy Beer, *How Did a LeBron James Video Highlight Sell For \$71,455? A Look At A Burgeoning Product Called NBA Top Shot*, FORBES (Jan. 23, 2021, 5:42 PM), <https://www.forbes.com/sites/tommybeer/2021/01/23/how-did-a-lebron-james-video-highlight-sell-for-71455-a-look-at-a-burgeoning-product-called-nba-top-shot/?sh=6249838d184b> [<https://perma.cc/9FN8-Y2MY>] (describing NBA Top Shot as a “blockchain-based platform that allows fans to buy, sell and trade numbered versions of specific video highlights”).

87. NBA TOP SHOT, [https://www.nbatopshot.com/search?orderBy=PRICE\\_USD\\_DESC](https://www.nbatopshot.com/search?orderBy=PRICE_USD_DESC) [<https://perma.cc/GX7C-Q7T3>].

88. CRYPTO SLAM!, <https://cryptoslam.io/> [<https://perma.cc/QR3D-YGL2>] (choose All-time) (stating that NBA Top Shot has produced over \$942 million in sales as of March 10, 2022).

89. *What to Expect: Fees & Finances*, NBA TOP SHOT (June 14, 2020, 12:53 PM), <https://blog.nbatopshot.com/posts/fees-finances> [<https://perma.cc/CP2V-DHAM>].

90. *Terms of Use*, NBA TOP SHOT (Feb. 2, 2022), <https://www.nbatopshot.com/terms> [<https://perma.cc/9749-UQDM>].

for those who sell NFTs to exert lingering control over a fully bought and paid for asset. The second, addressed in the following Section, is that the legal framework surrounding NFTs is not conducive to ownership, because the intellectual property regime that currently governs the internet is hostile to digital personal property ownership, imposing the contract-and-licensing regime of intellectual property instead.

NFTs are sold with the following representations: that an NFT token is the asset it represents, that the purchaser owns the asset, that the seller of the asset has no further control over an asset once conveyed, and thus that the buyer of the asset can do as they wish with it.<sup>91</sup> NFTs are sold on a promise similar to the promise one receives when buying a physical object. When a person buys a book from a brick-and-mortar bookstore, she owns that physical book, and is able to do what she wants with it, including sell it, read it, throw it away, or donate it. Digital property has never carried such a promise, and NFTs now attempt to offer it.<sup>92</sup> But after examining the underlying technology, those representations are not precisely true.

Imagine, for instance, that you fully bought and paid for a car, to only find out later that you were physically or technologically prevented from selling it to someone else. Constraints on the purchaser's right to transfer cut to the very heart of the NFT

91. *What Is CryptoKitties?*, CRYPTOKITTIES, <https://www.cryptokitties.co/> [<https://perma.cc/7WEL-AUDF>] (“Each cat is one-of-a-kind and 100% owned by you; it cannot be replicated, taken away, or destroyed.”); *Frequently Asked Questions: General*, GODS UNCHAINED, <https://godsunchained.com/learn/faq> [<https://perma.cc/259T-GMPD>] (“In Gods Unchained players completely own their digital items, giving them the freedom to trade, sell and use their cards any way they like – just like owning real, tangible cards.”); David Moore, *Terms of Service: Terms of Service for KnownOrigin Labs*, MEDIUM, <https://medium.com/knownorigin/terms-of-service-3efac6d0c20f> [<https://perma.cc/H29E-VGPN>] (last updated Apr. 23, 2021) (“Owning a Token is just like owning a physical artwork, like an original painting or print.”); *Own Something Extraordinary*, CRYPTOGRAPH, <https://www.cryptograph.co/About> [<https://perma.cc/F392-GMFS>] (“Cryptographs are one-of-a-kind digital creations made by world icons and artists. Thanks to blockchain technology a Cryptograph is 100% owned by its collector and it cannot be forged.”); *What is a Sorare Card?*, SORARE, <https://help.sorare.com/hc/en-us/articles/4402780446097-What-is-a-Sorare-card-> [<https://perma.cc/V7CH-PT8G>] (“A Sorare Card is an officially licensed digital collectible of a footballer . . . Each collectible enjoys many of the attributes of other blockchain-assets: it cannot be copied or taken away from you.”); AXIE Terms of Use, *supra* note 56 (“Axie Infinity is a distributed application that is currently running on the Ethereum Network and Ronin Network . . . , using specially-developed smart contracts . . . to enable users to own, transfer, battle, and breed genetically unique digital creatures. It also enables users to own and transfer other digital assets . . . .”); *Terms of Service*, TERRAVIRTUA, <https://terravirtua.io/terms-service> [<https://perma.cc/E99E-QYDP>] (“The Site allows (1) users to create a profile where they can post certain information about themselves, link to other websites, and display Digital Collectibles that they own . . . .”); *see also We Are Mythical: A Next Generation Game Technology Studio*, MYTHICAL GAMES, <https://mythical.games/> [<https://perma.cc/U6H7-HTEU>] (“We believe that true ownership of digital assets, verifiable scarcity, and integrated secondary markets are the future of games.”).

92. *See Finzer, supra* note 1 (explaining how non-fungible tokens on public blockchains will allow developers to build “common, reusable, inheritable standards relevant to all non-fungible tokens” such that the next generation of digital property will enable users to have the same basic primitives of physical “ownership, transfer, and simple access control”).

value proposition. One function bandied about (although not often implemented) is the ability to code the transfer function of the token to be “pausable,” such that the original creator of the token can pause its future transfer.<sup>93</sup> The ability to pause a token certainly has justifications. Consider a collectible card game whose creators must take a game-breaking card out of circulation.<sup>94</sup> While pausing is an understandable precaution in some circumstances, it strongly cuts against the representations to the buyer that an NFT creator has no further ability to interfere with or control the disposition of a token.

Another frequent restriction on ownership is kickbacks paid to the original content creator for downstream sales. Imagine that when you sell your used car to a friend that you had to pay Ford \$500. Such is the case on many NFT markets such as Rarible. The buyer of art on the Rarible marketplace purchases a token tied to a piece of art. The art and the token are bound together by a URL and perhaps a metadata file pointing to and describing the artwork, so that the token proves that it is related to the art.<sup>95</sup> But the token is not itself the art. The token merely shows that the token and the art have an immutable and unfalsifiable relationship. When the owner of a token tied to a piece of art on Rarible goes to sell that art, a portion of the sales price will be conveyed back to the creator of the token through the automated mechanisms of the governing smart contract.<sup>96</sup> Creators certainly have an incentive to sell such works, as they capture a fraction of each resale forward. But the result is the opposite of normal rules for the sale of goods. A book, once sold, does not kick back a percentage of future sales to the author. When we buy a car, we do not expect a portion of its sales price to be forwarded back to the person who sold it to us when we go to sell it.<sup>97</sup> Tokens that claw back a portion of the profit each time they are resold do not square with the representation that a buyer of an NFT owns it free and clear.

This value clawback functions via tinkering with the transfer function defined in the NFT smart contract. The smart contract that creates the tokens creates a range of

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93. See Stephen Hall, *How to Make a Pausable ERC20 Token*, MEDIUM (Dec. 3, 2018), <https://medium.com/coinmonks/how-to-make-a-pausable-erc20-token-9fb1ab5dc877> [<https://perma.cc/FCA8-YP3K>] (“Simply put, a pausable ERC20 token is a token that can be paused to prevent any transfers of the token when it is paused.”).

94. See, e.g., Scott Baird, *Magic The Gathering: 15 Cards That Had to Be Banned Before (or After) They Broke the Game*, SCREENRANT (Sept. 23, 2017), <https://screenrant.com/magic-the-gathering-cards-broke-the-game-banned/> [<https://perma.cc/BT3Q-LGSD>].

95. See Finzer, *supra* note 1 (“Metadata provides descriptive information for a specific token ID. In the case of the CryptoKitty, the metadata is the name of the cat, the picture of the cat, a description, and any additional traits (called ‘cattrIBUTES’, in the case of CryptoKitties).”).

96. See SUPERRARE, *supra* note 63 (“For primary sales, there is a 15% commission (creators receive 85%). For secondary sales, creators receive a 10% commission (aka royalty), providing passive revenue from an artwork if it continues to trade on the secondary market.”); RARIBLE, *supra* note 63 (noting that Rarible’s digital currency, \$RARI, is reserved for distribution to “sellers and buyers” on the Rarible marketplace).

97. Such regimes are preempted by copyright, including its “first sale” doctrine that protects buyers’ right to resell. See *Close v. Sotheby’s, Inc.*, 894 F.3d 1061, 1064 (9th Cir. 2018) (holding that claims under the California Resale Royalty Act, which “grant[ed] artists an unwaivable right to 5% of the proceeds on any resale of their artwork under specified circumstances,” were preempted by the 1976 Copyright Act).

features for the token, defining the number of tokens created, a protocol for giving third parties (such as a wallet or exchange) the ability to move tokens, fields for a URL or metadata file (or both) pointing to actual art elsewhere, and most importantly, a transfer function.<sup>98</sup> That transfer function can be written—as Rarible does—to move portions of each sale of a token back to the original creator’s account. Although some NFT creators, like SuperRare, have separate market logic, meaning that the token can be transferred without having to go through any given virtual marketplace, other contracts are written so that transfer can only happen within the confines of a certain virtual market, which has been written to provide additional controls to the market creator.<sup>99</sup>

This distinction matters. The problem is not that a marketplace takes a cut of sales—auctioneers do, from Sotheby’s to eBay. The difficulty is that by coding the seller’s cut into the token, the seller becomes a part owner of the asset: they take a cut *wherever* the asset is sold. One of the key ways of determining ownership throughout law is to look at who gains when the property rises in value, and who loses when the property falls in value.<sup>100</sup> When sellers code their cut of the NFT’s rise and fall directly into the token, they become hidden part owners. They have not sold the NFT free and clear after all.

Nor are the smart contracts that act as registry lists of who owns which tokens immune from the interference of the companies that create them. A smart contract, once coded to the blockchain, is of course immutable. Once the virtual machine’s state has been hashed into the blockchain, the entity that coded it cannot alter it. But there are several caveats. Smart contracts can be hacked, as in the case of the Decentralized Autonomous Organization, where fifty million dollars’ worth of invested funds were stolen.<sup>101</sup> Thus, smart contract code may need to be updated to

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98. See Finzer, *supra* note 1 (“By representing non-fungible tokens on public blockchains, developers can build common, reusable, inheritable standards relevant to all non-fungible tokens. These include such basic primitives as ownership, transfer, and simple access control.”).

99. *Id.* (writing that smart contracts “allow developers to place hard caps on the supply of non-fungible tokens” as well as enforce “persistent properties” such as which virtual markets a token can be transferred to or sold within).

100. See U.C.C. § 1-203 (AM. L. INST. & UNIF. L. COMM’N 2020); *WorldCom, Inc. v. Gen. Elec. Glob. Asset Mgmt. Servs. (In re WorldCom, Inc.)*, 339 B.R. 56, 71 (Bankr. S.D.N.Y. 2006) (“At common law, the central feature of a true lease is the reservation of an economically meaningful interest to the lessor at the end of the lease term. Ordinarily this means two things: (1) at the outset of the lease the parties expect the goods to retain some significant residual value at the end of the lease term; and (2) the lessor retains some entrepreneurial stake (either the possibility of gain or the risk of loss) in the value of the goods at the end of the lease term.” (quoting Edwin E. Huddleson, III, *Old Wine in New Bottles: UCC Article 2A—Leases*, 39 ALA. L. REV. 615, 625 (1998))). Similarly, another commentator explains the principle in reference to the parties’ “entrepreneurial stake,” the “up-side right or a down-side risk,” that each party has in the value of the leased equipment. JAMES WHITE & ROBERT SUMMERS, *WHITE AND SUMMERS’ UNIFORM COMMERCIAL CODE* § 22–3, at 1162–63 (6th ed. 2010).

101. See Nathaniel Popper, *A Hacking of More Than \$50 Million Dashes Hopes in the World of Virtual Currency*, N.Y. TIMES (June 17, 2016), <https://www.nytimes.com/2016/06/18/business/dealbook/hacker-may-have-removed-more->

patch vulnerabilities. The process of doing so is termed “wrapping.” An existing smart contract can be wrapped inside another smart contract, which assigns the tokens in contract A with features B, C, and D to tokens in contract W, with features X, Y, and Z. Users are then migrated from contract A to contract W, and a user who wishes to insist on the features and data of contract A finds themselves out of date and alone, the value of their asset greatly diminished if not destroyed. The inevitability of hacking and the necessity of updating software through wrapping indicates that the promises about the permanence and immutability of NFT smart contracts are overblown.

Transfer control, pausing, and wrapping are merely three ways in which claims of ownership over NFTs are, as a matter of design, less than the absolute package of ownership rights that NFT creators often promote to their purchasers. This by no means prevents the creation of enforceable property interests, any more than the ability to forge a deed prevents us from owning houses. However, such technical means of reasserting control over NFTs does raise the need for law that protects ownership interests. Just as a forged deed to a home would be declared invalid under the law, so a robust law of personal online property would deem certain types of transfers (say, a transfer back to the minter of a particularly valuable asset based on code in the transfer function) invalid. Legal remedies like conversion (a claim that one person took another’s property and must pay), replevin (a claim that one person must return another’s property) and trespass to chattels (a claim that a person has so interfered with another’s use and enjoyment of their property as to give rise to damages) are therefore important supplements to the technology. Law must act as an enabling backstop to NFT technologies, as will be further discussed in Parts II and III, below.

#### *D. NFT Taxonomy*

This Section seeks to map a taxonomy of NFTs and their attributes that can serve as a guide for later discussions on ownership restrictions. There are three large factors that dictate the rights of NFT purchasers: storage of the item being tokenized, the context for the value of the NFT, and the surrounding IP agreements circumscribing the use of the item.<sup>102</sup>

The first major factor to consider is where the item is actually stored. Take for example a piece of digital art that a user buys from Rarible. When that art is

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than-50-million-from-experimental-cybercurrency-project.html [https://perma.cc/97KV-6EVN] (writing how a hacker in 2016 “siphoned more than \$50 million of digital money away” from the Decentralized Autonomous Organization which had “raised \$160 million in the form of Ether, an alternative to the digital currency Bitcoin”).

102. See Finzer, *supra* note 1 (“But if digital ownership is more like ownership in the physical world (the freedom to hold and transfer indefinitely), this doesn’t always seem to be the case with digital assets. Rather, you own these assets *in specific contexts*, which may or may not make moving them around easy.”); *SuperRare Terms of Service*, NOTION, <https://www.notion.so/SuperRare-Terms-of-Service-075a82773af34aab99dde323f5aa044e> [https://perma.cc/2JMK-WMXL] (last updated Feb. 15, 2022) (setting forth the legally binding terms and conditions that a SuperRare user must consent to before joining the platform).

purchased, the smart contract transfers a token indicating that the buyer owns the art. The art itself may be stored electronically somewhere else. The process is similar to transferring a deed to a piece of real estate. The deed signifies ownership, but the real estate is still wherever it was before.

When it comes to transferring NFTs, the location of the item matters. The two main options for storage are on-chain and off-chain storage.<sup>103</sup> Off-chain storage means that the art or other digital item being purchased is stored somewhere else in a centralized server.<sup>104</sup> The token that someone buys merely keeps a record of who owns that item. The token contains a pointer that indicates that the token is tied to the digital item being sold, similar to a deed that has the address of the property being bought. Off-chain storage items are subject to deletion. Items that are stored off-chain will cease to exist if the company maintaining the storage server ceases to exist, or even turns off the server.<sup>105</sup> A user may also be subject to additional restrictions that are imposed by the server host. When a digital item is stored on-chain, the art itself is hashed directly into the token.<sup>106</sup> On-chain storage allows for the item to continue existing even if the original company hosting the item on its servers no longer exists. On-chain storage thus provides greater security for a purchaser because the value of the NFT is no longer tied to the continued existence of any one particular server or company.<sup>107</sup> The downside of on-chain storage is that space is much more limited.<sup>108</sup> Only smaller bits of data can be stored and traded directly in the tokens.

The second major consideration is how context-rich the environment for a particular NFT is. Property, both physical and digital, derives value from the context of which it is a part: think of the impact of a neighborhood on the value of a house. This means that control over the context in which property is used constitutes control over the property itself. To extend the house analogy, consider the power of a Homeowners' Association over individual property owners. What powerful context creates in grounding the value of property; it also can often cost in restricting owners' control.

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103. See Finzer, *supra* note 1 (“The first decision for developers is what metadata to represent on-chain vs. off-chain.”).

104. See *id.* (describing how off-chain data storage is required when the transaction data exceeds “the current storage limitations of the Ethereum blockchain” and therefore requires storage in a “centralized server somewhere, or a cloud storage solution like AWS”).

105. See *id.* (identifying one of the primary downsides of off-chain data storage is that “if the project goes offline, the metadata could disappear from its original source” and thereby cease to exist).

106. See *id.* (stating that when a digital item is stored on-chain, it denotes that the metadata was baked “directly into the smart contract representing the tokens”).

107. See *id.* (“The benefits of representing metadata on-chain are: 1) it permanently resides with the token, persisting beyond the lifecycle of any given application, and 2) it can change in accordance with on-chain logic. Point #1 is important if assets are intended to have long-lasting value far beyond their original creation. For example, a piece of digital art is expected to persist throughout the ages, regardless of whether the original website that was used to create the art is still around.”).

108. See *id.* (noting that despite the benefits of on-chain metadata, most “projects store their metadata *off-chain* simply due to the current storage limitations of the Ethereum blockchain”).



Just like physical property, NFTs vary in the richness of their surrounding context. And just like physical property, varying levels of context leads to varying levels of owner control. NFT vendors often control the context that creates value. Consider the value of a card in a collectible trading card game. The card has value because it is playable within the game, because the game's software accepts the card as a legitimate play in the game. That game software can change, and the value of the collectible would radically alter as a result. If the game creators determined that the card were no longer a legitimate play, it would not matter that the owner of the token could buy, sell, or transfer it. To be clear, this stands as no strong impediment to recognizing property interests in NFTs, any more than the existence of HOAs vitiates ownership interest in houses. Property can change in value, and to be an owner means to accept the risk of such shifts. But investors in NFTs are well advised to note that collectibles which are heavily dependent on playability, relationships with other assets, or other recognition by entities in control of the value-generating context, will be subject to a surprising degree of lingering contextual control.

The last major restriction on NFT ownership is the IP agreements that circumscribe an owner's use of the item they bought, which will be explored in greater depth in Part II, below. IP agreements range from not allowing owners to use the NFT in personal branding or advertising to restricting the marketplace in which someone can trade their NFT.<sup>109</sup> NFT license agreements are the fine print "click-wrap" underlying the bold claims of "true digital ownership." Imagine buying a book but discovering that an IP agreement only allowed you to read it on Thursday afternoons. Buying an Axie that is bound by an IP agreement is just licensing with extra steps.

NFTs that are tied to physical property can avoid many of the pitfalls created by storage, weak contextual environments, and restrictive IP agreements. NFTs have only just begun to be utilized in physical space with marketplaces like Zora, but it represents a potential goldmine for NFT application. Connecting a physical asset to an NFT could be as simple as using a QR code or serial number. There is no shortage of physical collectibles, including trading cards, art, stuffed animals, comic books, bobbleheads, and more. All of them could be tracked with NFTs and traded in online markets. Owners of NFTs tied to physical assets would not have to worry about storage restrictions or IP clawback that undermine the ownership interest: their concerns would be more mundane—whether the asset for which they own an NFT has been properly stored, for example, or damaged, or whether it exists at all.

## II. EXISTING LEGAL FRAMEWORK AND PROBLEMS

The current online legal regime surrounding digital asset purchases strongly supports the ability of an intellectual property rightsholder to claw back significant rights from purchasers.<sup>110</sup> In 2009, owners of George Orwell's *1984* were surprised

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109. See Birgit Clark & Ruth Burstall, *Crypto-Pie in the Sky? How Blockchain Technology is Impacting Intellectual Property Law*, 2 STAN. J. BLOCKCHAIN L. & POL'Y 252, 257 (2019) (detailing how smart contracts could be used to enforce IP agreements which may govern licenses and payment to IP owners, in addition to "rights management information, such as ownership, use permissions and payment[s]").

110. See FAIRFIELD, OWNED, *supra* note 12, at 43 ("[Y]ou made a copy of copyrighted

to see that Amazon had deleted the book from their Kindle accounts because the company that had added the book did not own the rights.<sup>111</sup> Because the digital publisher which had sold Orwell's books did not possess the right to do so, all copies that they had sold were deleted from buyers' accounts.<sup>112</sup> In 2018, Dapper Labs created three special CryptoKitties based on NBA star Stephen Curry.<sup>113</sup> Just as the digital publisher did not have the rights to publish *1984*, the creators of the Currykitties did not have the rights to Stephen Curry's likeness. As a result, Dapper Labs pulled the Currykitties from their website.<sup>114</sup>

The legal regime for digital personal property must evolve to support purchaser expectations for a kind of online ownership that has until now not been available. NFTs are expressly sold on the basis of narratives of ownership. Sites assert boldly, "If you can't sell your items, you don't own them," and promote "true ownership for players."<sup>115</sup> NFT businesses sell ownership. Yet selling ownership of digital assets flies in the teeth of the past two decades of legal development, which has all but eradicated ownership interests online in favor of a contract and licensing regime with which any purchaser of a Kindle eBook, video game, or subscriber to an online service is familiar.<sup>116</sup>

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material when you turned your device on – you loaded copyrighted material from storage into active memory. And if you make that copy without a license – if you don't click 'I Agree' to the terms and conditions of the rightsholder – then you've infringed copyright.”)

111. See Stone, *supra* note 30 (“[T]he books were added to the Kindle store by a company that did not have rights to them.”).

112. See *id.* (describing how issues over licensing rights led to consumers losing the books they had purchased).

113. See Nikhilesh De, *NBA Superstar Steph Curry Is Now the First Celebrity CryptoKitty*, COINDESK (May 7, 2018, 4:00 AM), <https://www.coindesk.com/nba-superstar-steph-curry-now-first-celebrity-cryptokitty> [<https://perma.cc/44QH-E74R>] (“Curry will be launching the first-ever celebrity-branded CryptoKitty.”).

114. See *Founder Starcoin, Inc. v. Launch Labs, Inc.*, No. 18-CV-972 JLS (MDD), 2018 WL 3343790, at \*3 (S.D. Cal. July 9, 2018) (“Dapper Labs released three ‘CurryKitties’ based on the likeness of NBA star Stephen Curry. Dapper Labs later pulled the CurryKitties from its website because it discovered that the parties involved in the licensing transaction did not have rights to Mr. Curry’s likeness.” (citations omitted)); see also William Suberg, *Celebrity-Themed CryptoKitties Take a ‘Cat Nap’ Amid NDA Lawsuit*, COINTELEGRAPH (May 25, 2018), <https://cointelegraph.com/news/celebrity-themed-cryptokitties-take-a-cat-nap-amid-nda-lawsuit> [<https://perma.cc WR9H-DY98>] (“We have reason to believe Steph wasn’t as involved in the CurryKitties as we thought. Until we’re sure he’s an active participant, we’re suspending the campaign.”).

115. GODS UNCHAINED, <https://godsunchained.com/> [<https://perma.cc/YJL6-QKWF>] (“Unlike other free-to-play games, Gods Unchained gives you complete ownership over your in-game items. Collect rare cards, build your deck and sell cards to other players.” (emphasis omitted)).

116. See FAIRFIELD, OWNED, *supra* note 12, at 45 (describing the difference between contracting in online versus physical spaces).

### A. The Legal Literature

The legal literature on NFTs is very much in its infancy. There are two sets of literature worth noting. First, there is a moderately developed literature on smart contracts, the programs that run on blockchains and execute transfers of NFTs. Second, there is a nascent literature on the potential property uses of blockchain technology, beginning with articles on bitproperty and culminating in a very limited selection discussing NFTs. The following Sections address each in turn.

#### 1. The Smart Contract Fallacy

The programs that create and convey NFTs are called smart contracts, an unfortunate early nomenclature developed from crypto-theorists' desire to do away with law. The idea behind calling a blockchain program a smart contract was that the program would replace the legal instrument or that law would no longer be needed if the programs were automatically executable.<sup>117</sup> But the analogy was born largely out of technologists' misunderstanding of what a contract is: a contract is the making of promises, not the means of their execution.<sup>118</sup> Automatically executing programs are not contracts if there has been no bargained-for exchange of promises or intent to enter into binding legal relations.<sup>119</sup>

The contract analogy for blockchain-based code has largely been an unfortunate false start.<sup>120</sup> Nearly every legal analysis of smart contracts concludes that while the code might help execute a contract, smart contract programs are not themselves contracts.<sup>121</sup> Contracts are bargains, expressed intentions, not code.<sup>122</sup> To provide a

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117. See Kevin Werbach & Nicolas Cornell, *Contracts Ex Machina*, 67 DUKE L.J. 313, 322 (2017) ("The evolution from electronic, to data-oriented, to computable contracts embodies a trend toward greater machine autonomy. As computers can increasingly replace humans in negotiating, forming, performing, and enforcing contracts, contracts can increasingly operate with the speed and consistency of machines."); Harry Surden, *Computable Contracts*, 46 U.C. DAVIS L. REV. 629, 639–40 (2012) (differentiating between traditional contracts memorialized with words and data-oriented contracts memorialized in computer data).

118. See CHARLES FRIED, *CONTRACT AS PROMISE: A THEORY OF CONTRACTUAL OBLIGATION* 8 (2d ed. 2015) ("By promising we transform a choice that was morally neutral into one that is morally compelled.").

119. See *id.* at 14 (noting that the institution of a promise is a necessary and required component of contract formation whereby one party binds themselves "to another so that the other may expect a future performance").

120. See Werbach & Cornell, *supra* note 117, at 339 (noting that in "a very real way, smart contracts are *not* intended to be legally enforceable" because parties in a smart contract do not objectively display an intent to enter into the self-executing smart contract).

121. See *id.* at 341 ("Though they might not constitute promises per se, smart contracts are voluntary mechanisms that purport to alter the rights and duties of the parties."); Nick Szabo, *Formalizing and Securing Relationships on Public Networks*, FIRST MONDAY (Sept. 1, 1997), <https://firstmonday.org/article/view/548/469> [<https://perma.cc/LJ27-4NVH>] (defining the hallmark of contract formation as a "set of promises" agreed to in a mutual meeting of the minds which smart contracts may not fulfill).

122. See Werbach & Cornell, *supra* note 117, at 342 (writing that contracts require "overt

basic example, assume an NFT vendor promises that upon payment of a certain amount of ether, a purchaser will receive a given NFT. That is the contract. Assume then that the purchaser received a different NFT through automated execution of smart contract code. That is a breach of the contract. Contracts involve the creation of reciprocal legal obligations, a promise for a promise, money for a good. It is entirely possible to make a contract and then execute it automatically—we do every time we buy gas with a credit card at a pump—but that does not make the mode of automatic execution, or the code, the contract.<sup>123</sup> Calling the “smart contract” the contract would be like calling the truck that delivers the goods you order the contract. The truck and the smart contract are not the contract; they merely execute the contract.<sup>124</sup> Contract law is about creating those binding promises.<sup>125</sup> The technology of executing those promises matters but doesn’t go to the heart of contract. The facile analogy with contract law comes from the fact that it looks as though the coded execution is enforcing deals that take the form of something-for-something.<sup>126</sup>

## 2. The Nascent NFT Literature

There is a developed legal literature on first-generation cryptocurrencies, which focuses on finding the right legal characterization of blockchain-based activities and assets. The overarching theme of that literature is that legal regulation of blockchain depends not on the technology, but on how humans are using it.<sup>127</sup> If the blockchain

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acts of assent” in which “[p]arties must engage in some expression that displays a shared understanding of the agreement, and a shared intent to bind themselves by its terms”); Surden, *supra* note 117, at 631 (“Commercial contracts involve promises under specified terms and conditions.”).

123. See Werbach & Cornell, *supra* note 117, at 323 (observing that a vending machine operates as a type of immediately executing contract because it “directly effectuates performance by taking in money and dispensing products” and “incorporates enough security to make the cost of breach (breaking into the machine) exceed the potential awards”).

124. See *Raffles v. Wichelhaus* [1864] 159 Eng. Rep. 375, 376 (finding that no contract is formed when both parties mutually misunderstand the meaning of a term of agreement).

125. See FRIED, *supra* note 118, at 17 (“But since a contract is first of all a promise, the contract must be kept because a promise must be kept.”).

126. See Werbach & Cornell, *supra* note 117, at 356 (“First, one might suggest that smart contracts, by making performance inevitable, are no longer promises at all. If so, smart contracts would not reinforce the practice of promising. Whereas contract law supports promising by giving promisors legal reasons to perform, smart contracts do away with the need for reasons altogether, and fail to support the moral agency involved in promising. Pragmatically, it may not be obvious why we should value promising, apart from the reliable commitments that promising enables.”).

127. See Ethan D. Troitz, *The Times They Are a Changin’: Surveying How the Howey Test Applies to Various Cryptocurrencies*, 11 ELON. L. REV. 201, 202 (2019) (detailing how the “meteoric rise of cryptocurrencies presents significant uncertainties for both federal and state regulators” who must adjust to enforce the legal regulation of blockchains based on how people are using them); Joshua A.T. Fairfield, *The Human Element: The Under-Theorized and Underutilized Component Vital to Fostering Blockchain Development*, 67 CLEV. ST. L. REV. 33, 33 (2019) [hereinafter Fairfield, *Human Element*] (“Let’s just call a spade a spade: people are providing direct actual governance. The humans, again, are part of the technology. You

is being used to transfer value, it is treated as a money substitute under the Bank Secrecy Act.<sup>128</sup> If a coin is issued to help raise money to start a business (a “security coin”), it is treated by the SEC as a security,<sup>129</sup> and the Commodity Futures Trading Commission (CFTC) and IRS treat cryptocurrency tokens as commodities when they are used as such,<sup>130</sup> while privacy laws apply when a distributed ledger is used to store and process personal information. The technology is largely the same, but widely differing legal regulatory regimes apply based on the different ways people use the technology.<sup>131</sup>

That use-drives-regulation approach has held as tokens create property interests.<sup>132</sup> If a token is sold as property, treated by humans as property, and passed

cannot separate them.”).

128. See FIN. CRIMES ENF’T NETWORK, U.S. TREASURY, FIN-2019-G001, APPLICATION OF FINCEN’S REGULATIONS TO CERTAIN BUSINESS MODELS INVOLVING CONVERTIBLE VIRTUAL CURRENCIES (2019) (explaining how the Bank Secrecy Act does and may apply to “convertible virtual currencies”); see also Requirements for Certain Transactions Involving Convertible Virtual Currency or Digital, 85 Fed. Reg. 83,840, 84,840–41 (Dec. 23, 2020) (to be codified at 31 C.F.R. pts. 1010, 1020, 1022) (“FinCEN is issuing this notice of proposed rulemaking to seek public comments on a proposal to require banks and money service businesses (‘MSBs’) to submit reports, keep records, and verify the identity of customers in relation to transactions involving convertible virtual currency (‘CVC’) or digital assets with legal tender status (‘legal tender digital assets’ or ‘LTDA’) held in unhosted wallets (as defined below), or held in wallets hosted in a jurisdiction identified by FinCEN. FinCEN is proposing to adopt these requirements pursuant to the Bank Secrecy Act (‘BSA’). To effectuate certain of these proposed requirements, FinCEN proposes to prescribe by regulation that CVC and LTDA are ‘monetary instruments’ for purposes of the BSA.”); Trotz, *supra* note 127, at 210 (“The most extensive guidance from the SEC on whether cryptocurrencies are securities is found in the SEC’s report on the DAO (‘The DAO Report’), where the SEC determined for the first time that the issuance of a cryptocurrency constituted an unlawful securities offering.”).

129. See Trotz, *supra* note 127, at 205 (noting that cryptocurrencies can be used “as a means of fundraising by handing out equity using digital tokens instead of traditional shares”).

130. See Allison Christians, *Taxation in the Age of Smart Contracts: The CryptoKitty Conundrum*, 16 OHIO ST. TECH. L.J. 91, 99 (2020) (describing the global response for how tax authorities have regulated smart contracts and blockchains).

131. See Fairfield, *Human Element*, *supra* note 127, at 33–34 (noting that technological innovation and regulation are inseparable from the human relationships and conduct which determine how technology should be governed); Fairfield, *BitProperty*, *supra* note 20, at 870 (observing that the “[w]ise regulation of trustless technologies will take note of the multiple different use cases to which” people use and apply the technology).

132. See *Kremen v. Cohen*, 337 F.3d 1024, 1030 (9th Cir. 2003) (“Property is a broad concept that includes ‘every intangible benefit and prerogative susceptible of possession or disposition.’ We apply a three-part test to determine whether a property right exists: ‘First, there must be an interest capable of precise definition; second, it must be capable of exclusive possession or control; and third, the putative owner must have established a legitimate claim to exclusivity.’” (citations omitted)); see also Fairfield, *BitProperty*, *supra* note 20, at 834–38 (describing the characterization of cryptocurrencies as property based on how people used them); *United States v. Petix*, No. 15-CR-227A, 2016 WL 7017919, at \*5 (W.D.N.Y. Dec. 1, 2016) (“Bitcoin operates as a medium of exchange like cash but does not issue from or enjoy the protection of any sovereign; in fact, the whole point of Bitcoin is to escape any entanglement with sovereign governments. . . . Like marbles, Beanie Babies™, or Pokémon™

down through wills as property, law will begin to take it seriously as property.<sup>133</sup> I and others have argued for over a decade that when digital assets are treated by owners as personal property, the law of personal property should apply; the same goes for tokens that act as digital deeds for real estate, a solution that could end the need for title searches and clear up confusion over ownership of land.<sup>134</sup>

The legal literature's approach stands in stark distinction to the ways that crypto-evangelists have framed the legal debate. Much early activity around cryptocurrency centered on eliminating middlemen, banks, and lawyers in particular.<sup>135</sup> For example, many bitcoin enthusiasts were drawn to the concept of a currency not regulated or controlled by a bank or government.<sup>136</sup> Law, then, was something that crypto-evangelists expected to wither away, with digital wallets replacing banks and programs replacing contracts.<sup>137</sup> This is a common theme among technologists, who do not have a sense of the history of law.<sup>138</sup> With the internet, government power was

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trading cards, bitcoins have value exclusively to the extent that people at any given time choose privately to assign them value."); Parker F. Taylor, Vanessa A. Woods & Jack Tanenbaum, *Estate Planning with Cryptocurrency*, A.B.A. (2019), [https://www.americanbar.org/groups/real\\_property\\_trust\\_estate/publications/probate-property-magazine/2019/july-august/estate-planning-cryptocurrency/](https://www.americanbar.org/groups/real_property_trust_estate/publications/probate-property-magazine/2019/july-august/estate-planning-cryptocurrency/) [<https://perma.cc/K5T2-3PKJ>] ("Although cryptocurrency can be treated under various laws like conventional fiat currency (i.e., cash), the IRS's current position is to treat cryptocurrency as property and not currency for tax purposes.").

133. See *Access to Digital Assets of Decedents*, NAT'L CONF. STATE LEGISLATURES (Jan. 24, 2021), <https://www.ncsl.org/research/telecommunications-and-information-technology/access-to-digital-assets-of-decedents.aspx> [<https://perma.cc/E8CZ-JKXH>] ("[A]t least 48 states and the U.S. Virgin Islands have enacted laws addressing access to email, social media accounts, microblogging or other website accounts, or other electronically stored assets, upon a person's incapacity or death.").

134. See, e.g., Fairfield, *BitProperty*, *supra* note 20, at 827–28 (expressing how tokenized "public ledgers offer new solutions to old property problems").

135. See Andrew Ross Sorkin, *Demystifying the Blockchain*, N.Y. TIMES (June 27, 2018), <https://www.nytimes.com/2018/06/27/business/dealbook/blockchain-technology.html> [<https://perma.cc/K483-FRPW>] ("If it is successful, blockchain technology will bring a new level of enhanced trust to business and will also cut out the middlemen that have historically tracked — and profited — from the complexity of so many different systems trying to communicate with each other.").

136. See Jon Martindale, *Go Ahead, Pass Laws. They Can't Kill Bitcoin, Even if They Try*, DIGITALTRENDS (Dec. 19, 2017), <https://www.digitaltrends.com/computing/dont-worry-about-bitcoin-regulation-it-cant-be-stopped/> [<https://perma.cc/V3UK-V7KE>] (claiming that bitcoin cannot be regulated).

137. See Jerry Brito, *Foreword* to PAUL ANNING, LORNA BRAZELL, MARK BRAILSFORD, JERRY BRITO, MATTHEW J. CLEARY, JILLIAN FRIEDMAN, STUART HOEGNER, MICHAEL TAYLOR, RYAN J. STRAUS & CHRISTOPH-NIKOLAUS VON UNRUH, *THE LAW OF BITCOIN*, at xiii, xiii (Stuart Hoegner ed., 2015) ("A common misconception about Bitcoin is that it is not regulated."); Jerry Brito, *Bitcoin Remains a Tool for Freedom, Even While Going Mainstream*, REASON (May 19, 2014, 3:00 PM), <http://reason.com/archives/2014/05/19/bitcoin-remains-a-tool-for-freedom-even> (arguing that bitcoin will likely tend toward centralization and regulation). *But see* Martindale, *supra* note 136.

138. See Bratspies, *supra* note 40, at 8–9.

supposed to wane.<sup>139</sup> It did not.<sup>140</sup> Copyright was purportedly dead with Napster.<sup>141</sup> It was not.<sup>142</sup> Virtual worlds were supposed to be free of real-world law.<sup>143</sup> They were not.<sup>144</sup> And likewise, smart contracts will not replace contract law, nor will oracles and code replace lawyers, judges, and juries. Providing strong legal analogies to what has gone before serves to put property tokens in the right relation with the reasoning of courts to date and gives courts a place to look when considering how to resolve disputes involving litigants who use a new technology to act in entirely recognizable ways (theft of a bitcoin is theft, for example).

Here, however, the literature diverges. The few extant legal analyses of NFTs focus heavily on intellectual property.<sup>145</sup> It is easy to see why: unchecked internet copying poses an existential threat to IP rightsholders, and cryptoledgers provide a way to stop copying, to allow artists to sell one copy of an artwork to one person, or an author to sell one copy of a book to one reader. But if the technology is analyzed primarily within the framework of intellectual property and contractual licensing rather than the law of personal property, NFTs become copyright licensing with extra steps. They lose the characteristics of ownership that interest vendors and purchasers. A market for personal property that is governed predominantly by intellectual property principles will not succeed. Just as with e-books and fully purchased movies, collectors and investors will not truly own their intellectual-property-entangled NFTs, and thus will not be willing to pay prices that reflect true ownership.

As NFTs enter the mainstream, they will be sold, invoking the law of sales of goods. Indeed, some will be linked to and represent the sale of physical goods. They will be used as collateral under the law of secured transactions, be inherited under the law of wills, descent, and distribution, and so on. Each of these rely on a vital characterization of the assets as, at essence, personal property rather than intellectual property. To enable these foundational uses of property, NFTs must be firmly grounded within a theory of property, and their primary legal characterization must be that they are personal property. The following Sections begin to frame and then embark on that task.

### *B. Sorting Property and Contract*

NFTs provide the opportunity for a serious examination of the tangled legal relationships online between property and contract, and between digital personal property and intellectual property. This reexamination is long overdue. Establishment of clear principles surrounding digital personal property—*not* intellectual property—is necessary for NFTs to succeed. NFT buyers and sellers

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139. See David R. Johnson & David G. Post, *Law and Borders—The Rise of Law in Cyberspace*, 48 STAN. L. REV. 1367, 1387 (1996) (“Even if we agree that new rules should apply to online phenomena, questions remain about who sets the rules and how they are enforced. We believe the Net can develop its own effective legal institutions.”).

140. See Jack L. Goldsmith, *Against Cyberanarchy*, 65 U. CHI. L. REV. 1199 (1998).

141. See *A&M Recs., Inc. v. Napster, Inc.*, 239 F.3d 1004, 1018 (9th Cir. 2001).

142. *Id.*

143. See Joshua A.T. Fairfield, *The Magic Circle*, 11 VAND. J. ENT. & TECH. L. 823 (2009).

144. *Id.*

145. See Evans, *supra* note 24; Clark & Burtsall, *supra* note 109, at 252.

clearly intend to convey an ownership interest in digital personal property.<sup>146</sup> The law of online transactions has suffered badly from the lack of such anchoring examples. Buyers of NFTs believe they are buying personal property, and sellers claim they are selling it. The token itself is susceptible only to possession and control by one entity, just like a physical object.<sup>147</sup> The power of NFTs as a grounding example for digital personal property cannot be overstated. Prior to NFTs, the best example of digital personal property was a domain name.<sup>148</sup> To see the shift in online property law that NFTs represent, consider how much more convincing claims of ownership over NFTs are than identical claims over assets won by a player in a non-NFT-based video game.<sup>149</sup> Both assets consist of a database entry ascribing an intellectual property resource to a particular account. Yet because the code is immutable, because there is no centralized entity managing the blockchain after the smart contract is set in motion, and because the user has the technologically assured ability to use, exclude, pass on, or destroy the token without further interference from the token creators, NFT claims for personal property status stand in a completely different light than claims to standard video game assets. It is that difference that is worth capturing. NFTs represent an important opportunity, therefore, to rebalance a law of digital transactions that has nearly eliminated online personal property interests entirely in favor of long-term control over assets by those who pretend to have sold them.

The tangled expansion of intellectual property law in the first three decades of the commercial internet has made the process of establishing clear and simple digital personal property rights more complicated than need be.<sup>150</sup> Sales law can simplify the law surrounding transactions in digital personal property.<sup>151</sup> NFT sales are billed as the sale of a personal property interest, and that is precisely how the law should treat them. Fully theorizing that simple statement takes some careful attention to the evolution of law online.

The core question is how much control a seller may exercise over an immediate or eventual buyer's use of a fully bought-and-paid-for digital asset. Consider the

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146. *E.g.*, GODS UNCHAINED, <https://godsunchained.com> [<https://perma.cc/YJL6-QKWF>] (stating that Gods Unchained gives the players true ownership of their items).

147. *See* *Kremen v. Cohen*, 337 F.3d 1024, 1030 (9th Cir. 2003) (“Finally, registrants have a legitimate claim to exclusivity. Registering a domain name is like staking a claim to a plot of land at the title office. It informs others that the domain name is the registrant’s and no one else’s.”).

148. *See id.* (finding that ownership of a domain name to a website is “exclusive” to the registrant).

149. *See* Robert Farrington, *Play-to-Earn Gaming is Driving NFT and Crypto Growth*, FORBES (Dec. 13, 2021), <https://www.forbes.com/sites/robertfarrington/2021/12/13/play-to-earn-gaming-is-driving-nft-and-crypto-growth/?sh=557d4418c2dc> [[perma.cc/KGN9-6SEU](https://perma.cc/KGN9-6SEU)] (describing shift to play-to-earn).

150. *See* AARON PERZANOWSKI & JASON SCHULTZ, *THE END OF OWNERSHIP: PERSONAL PROPERTY IN THE DIGITAL ECONOMY* 57 (2016) [hereinafter PERZANOWSKI & SCHULTZ, *END OF OWNERSHIP*] (describing the confusing use of fine print in transactions); *see also* Aaron Perzanowski, *Fixing RAM Copies*, 104 NW. U. L. REV. 1067, 1089–90 (2010) [hereinafter Perzanowski, *Fixing RAM*] (describing how copyright law was driven by the need to address confusion).

151. *See infra* Section III.A.1.



following potential analogies. A buyer purchases a car and can paint it whatever color she likes despite the former owner's protests, even if she still owes money on the car. But she could not do so if she merely leased the vehicle. Courts sometimes ask if a legal interest is property *or* contract.<sup>152</sup> Consider the question of whether social media pages are property of the decedent, in which case they would be passed on to heirs, or a mere contract between the platform and user, in which case they would not be. But courts also routinely interpret scenarios in which there is both property *and* contract. A contract to buy a car or a jug of milk or (I argue) an NFT falls into this set of scenarios.

Even if a court determines that there is a contract to convey some property interest, there are questions about the nature of the contract and the degree of control that the seller retains over the asset in the buyer's hands. Some contracts are immediate and soon over. Consider buying a cup of coffee or a sandwich. The buyer and seller exchange goods for payment and go their separate ways. There are no trailing contractual obligations, no long-term control of one party over the other. Other types of contracts impose long-term control. For example, a lessor can control what a lessee does with the lessor's property over the period of the lease. A licensor can control what the licensee does with software during the entire period of the license.<sup>153</sup> So in selecting the relationship between property and contract online, courts must ask whether the parties contemplated conveying a property interest, and if so, whether the parties intended that contract as an immediate contract with little or no long-term control, or a longer-term retained-control contract like a lease or a license.

The legal fate of NFTs depends on their characterization as property, and the transaction as a sale. There is a lot at stake. When someone hacks an NFT smart contract to steal the tokens—and someone will<sup>154</sup>—does the remedy sound in property (replevin, conversion) or in contract (intentional interference with contractual advantage or, in some cases, secondary copyright infringement or the Digital Millennium Copyright Act's anticircumvention provisions)? When criminal charges are brought, will they be for theft or unauthorized access of a protected computing system—or both? When someone who owns NFTs dies, do those NFTs pass to the decedent's heirs as property?<sup>155</sup> Or are they closer to social media accounts, mere contracts between the decedent and a company?

My conclusion, below, will be that NFTs should be treated as full personal property, that sales of NFTs should follow the law of sales of personal property, and

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152. See *UMG Recordings, Inc. v. Augusto*, 628 F.3d 1175, 1177–78 (9th Cir. 2011) (determining whether the distribution of compact discs for marketing purposes constituted a transfer of ownership or a contract to promote the music contained on the disc).

153. See *FAIRFIELD, OWNED*, *supra* note 12, at 44 (“As a non-owner, you cannot make copies, even as a necessary part of using the product, without doing exactly as the licensor demands.”).

154. See, e.g., Nathaniel Popper, *A Hacking of More Than \$50 Million Dashes Hopes in the World of Virtual Currency*, N.Y. TIMES (June 17, 2016), <https://www.nytimes.com/2016/06/18/business/dealbook/hacker-may-have-removed-more-than-50-million-from-experimental-cybercurrency-project.html> [<https://perma.cc/AQV6-AWLW>] (describing the DAO smart contract hack of June 18, 2016, which siphoned off 3.2 million ether).

155. See *United States v. Petix*, No. 15-CR-227A, 2016 WL 7017919, at \*5 (W.D.N.Y. Dec. 1, 2016) (characterizing bitcoin as property).

that the sooner those legal metaphors are firmly ensconced in case law, the sooner NFTs will reach their full potential as a way of satisfying the human need for digital rareness.<sup>156</sup> Treating NFTs as personal property will also begin to heal the longstanding and growing infection of online spaces with overbroad intellectual property licenses by providing a strong, clear counterexample for courts to build on when differentiating between digital personal property and intellectual property.

We should regulate technologies according to how humans use them.<sup>157</sup> Thus, although NFTs are administered via a smart contract, the tokens are being promoted, sold, collected, displayed, transferred, invested, and in general treated by humans as personal property. When law selects a metaphor for a new technology, it works best when it finds close analogies.<sup>158</sup> Here, the law of personal property fits best with how humans are using NFTs. No analogy is perfect. But finding the closest analogy and learning from it can create, with some innovation, stable systems for understanding how we ought to govern emerging technology.<sup>159</sup> This works because humans run our social system of cooperation on narrative, and humans don't change that much.<sup>160</sup> Stories that help us arrange how we live together (like the story of property—this is mine, that is yours) capture our imagination.<sup>161</sup> Strong stories also guide courts, as in the discussion above about whether software is licensed or sold.

The growing field of non-fungible tokens and the electronic instructions that accompany their governance, use, and transfer, will invoke the law and analogies of property more than the law and analogies of contract or the law of licensing. When parties convey non-fungible tokens that carry rights in specific property, subject to control by a single owner who possesses the token, we are looking at something that far more closely resembles personal property law arrangements than contract or licensing ones. This stands in stark distinction to the momentum of internet law, which has tended to upgrade the rights of corporations through their contracts and licenses, and downgrade owners to mere users.<sup>162</sup>

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156. See *infra* Part III.

157. See JOSHUA A. T. FAIRFIELD, *RUNAWAY TECHNOLOGY: CAN LAW KEEP UP?* 75 (2021) [hereinafter FAIRFIELD, *RUNAWAY TECHNOLOGY*] (“But a successful rule does not give credence to the technologist’s claims of what a technology ‘really’ is. What matters is how humans use it.”).

158. *Id.* at 84.

159. See generally Cass Sunstein, *On Analogical Reasoning*, 106 HARV. L. REV. 741, 782–83 (stating that one advantage to analogical reasoning is creating a solid foundation of understanding without requiring people to develop full, new theories).

160. YUVAL NOAH HARARI, *SAPIENS* 28–32 (2015) (explaining how humans make up stories to cooperate at large scale); see FAIRFIELD, *RUNAWAY TECHNOLOGY*, *supra* note 157, at 18–20 (describing law as a narrative that can be updated to meet human needs).

161. See FAIRFIELD, *OWNED*, *supra* note 12, at 11 (quoting cyberlaw expert Bryan Choi as stating that “[p]roperty is an intuition. It is an emotion.”).

162. See *id.* at 26 (“Intellectual property has been twisted and stretched to create a system of centralized and feudal command and control, rather than foster experimentation and innovation.”).

*C. NFTs Face a Hostile Intellectual Property Landscape*

NFTs face serious legal barriers to delivering on their promise, and the reason is profoundly ironic. Law online is a matter of powerful contracts and similarly broad intellectual property licenses, such that we do not truly own the devices we rely on, or the digital purchases we access through them.<sup>163</sup> We will explore the history of this regime below, but the key point is that it was designed to address the problems that NFTs were created to handle. Computers work by copying. The advent of the internet drove the spread of copied intellectual property: Napster, YouTube, torrent sites, and more. To manage this flood of illegal copying, law expanded contract rights through End User License Agreements (EULAs) and intellectual property rights through doctrines like the RAM-copy doctrine to give intellectual property holders near total control over the assets that they license—not sell—to consumers.<sup>164</sup> Licensing and streaming are the governing paradigms online. Online ownership has become all but moribund.<sup>165</sup>

This is more poignant because the bulk of legal scholarship around NFTs centers around the potential of the technology to help intellectual property creators—artists—sell their work by selling single artworks or verified art within a limited series, or as a way of helping musicians sell one copy to one customer.<sup>166</sup> But the scholarship to date has missed the point. The current online legal landscape actively hinders the promise of NFT technology by making the promises of artists who truly sell tokenized artwork not believable. To sell single, unique copies of digital assets, we must permit owners to “reproduce” the work to the extent necessary to transfer it to someone else (by making a copy and erasing the original, usually).<sup>167</sup> We must separate out that limited right from the traditional copyright—the power to make infinite copies—that is retained by the author of the work. Given the law of the last two decades and the way that networked computers work, that action is not possible without more legal development.<sup>168</sup>

For example, when a person buys a Kindle eBook, they agree simply by opening the app that they merely license the book; they do not own it.<sup>169</sup> The counterintuitive licensing rather than ownership of digital property has been the digital norm ever

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163. See PERZANOWSKI & SCHULTZ, *END OF OWNERSHIP*, *supra* note 150, at 123–25 (detailing how companies acquire power through online contracting).

164. *Id.*

165. *Id.* at 1.

166. See, e.g., Evans, *supra* note 24; Clark & Burtsall, *supra* note 109; Wilson, *supra* note 29.

167. See generally Sarah Reis, *Toward a “Digital Transfer Doctrine”?: The First Sale Doctrine in the Digital Era*, 109 NW. U. L. REV. 173 (2015) (arguing for an updated first sale doctrine for digital items).

168. See *Capitol Recs., LLC v. ReDigi Inc.*, 934 F. Supp. 2d 640, 655 (S.D.N.Y. 2013) (interpreting and applying the first sale doctrine toward a legal issue involving a copyright question in the digital realm).

169. See *Kindle Store Terms of Use*, AMAZON, <https://www.amazon.com/gp/help/customer/display.html?nodeId=200771440> [<https://perma.cc/FN4D-2SXM>] (last updated Mar. 15, 2016) (“Kindle Content is licensed, not sold, to you by the Content Provider.”).

since a triad of cases from 1993 to 1995 created the RAM copy doctrine.<sup>170</sup> Early and highly controversial copyright decisions from the Ninth Circuit led to the current state of affairs: whenever a person pulls up their e-book to read it, making a copy from ROM into RAM, that act creates a copy that must be licensed.<sup>171</sup> As a license, the digital property can be subject to whatever terms and conditions the seller chooses to impose on the so-called “buyer,” who is actually just a licensee. This is not true for real-world property; you need no IP license to read a book you’ve bought because you are not making a copy of it.<sup>172</sup> The difference may seem technical, but it is, in fact, profound. If a license agreement restricts you from doing a thing while using the licensed intellectual property, you may not do that thing if the asset is digital, whereas you may do the thing if the asset is physical. The one is a violation of an intellectual property license (because you are doing something while making a copy of the asset merely by using it on a digital device, you must follow the terms of the license that gives you the right to make the copy), and the other is not.<sup>173</sup> Thus, people who own items in virtual worlds must follow license conditions in using items that they have fully purchased and paid for, and can lose all of their property if they do not.<sup>174</sup> An owner of an Oculus Quest 2 who deletes her Facebook (and all of the surveillance and targeted advertising that entails) loses her Oculus games.<sup>175</sup>

This is the very thing that NFTs seek to avoid. The value proposition of NFTs is based on invoking offline narratives of free-and-clear ownership, in which the owner can use, enjoy, display, and dispose of the property without any interference from third parties. This stands in sharp contrast to the online intellectual property licensing model, where the IP holder has the permanent power to dictate how the owner of a given copy may use or dispose of it. Movies purchased from Google Play and eBooks from Amazon are simply not owned. NFTs are intended to fix that, hence the opening quote for this article drawn from the “NFT Bible”: “We have tons of digital stuff, we just never really owned it.”<sup>176</sup> But the difficulty is that even after the innovations NFTs have to offer, there is little that has changed in the legal environment.

Without further development of strong legal analogies, ownership of a token linked to a piece of intellectual property will not convey the same legal rights as

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170. See *MAI Sys. Corp. v. Peak Comput., Inc.*, 991 F.2d 511, 518–19 (9th Cir. 1993) (supporting the conclusion that the loading of copyrighted software into RAM creates a “copy” under the Copyright Act); *Advanced Comput. Servs. of Mich., Inc. v. MAI Sys. Corp.*, 845 F. Supp. 356, 364 (E.D. Va. 1994) (same); *Triad Sys. Corp. v. Se. Express Co.*, 64 F.3d 1330, 1334 (9th Cir. 1995) (same).

171. *MAI Sys. Corp.*, 991 F.2d at 518–19; *Advanced Comput. Servs. of Mich., Inc.*, 845 F. Supp. at 364; *Triad Sys. Corp.*, 64 F.3d at 1334.

172. See PERZANOWSKI & SCHULTZ, *END OF OWNERSHIP*, *supra* note 150, at 1–3 (outlining the differences between analog and digital book ownership); see also Perzanowski, *Fixing RAM*, *supra* note 150, at 1088 (defining the term copy as a “material object[] . . . in which a work is fixed . . . and from which the work can be perceived, reproduced, or otherwise communicated” (footnote omitted) (quoting 17 U.S.C. § 101)).

173. See *MAI Sys. Corp.*, 991 F.2d at 518–19 (requiring users to follow license agreements when making a copy from ROM to RAM); *Advanced Comput. Servs. of Mich., Inc.*, 845 F. Supp. at 364 (same); *Triad Sys. Corp.*, 64 F.3d at 1334 (same).

174. See Gurwin, *supra* note 27.

175. *Id.*

176. See Finzer, *supra* note 1.

ownership of a physical object in which intellectual property is embedded. NFT companies attempt to resolve this problem through NFT licenses that grant certain intellectual property rights to the owner of the token, but these licenses vary widely and have constraints and restrictions that are entirely inconsistent with the kind of ownership that NFT companies promote.

An example may help clarify the issue. Imagine that one purchases an NFT linked to a piece of art on a digital marketplace. (It may help the reader to open a browser to a marketplace like rarible.com to make these points clear.) With an exchange of cryptocurrency paid to a smart contract that acts as a registry of who owns what, the purchaser's wallet receives a verified hash of a token that includes a pointer to a metadata file describing the art, and a URL to the art itself.<sup>177</sup> Practically speaking, people talk as though the token and the art are the same thing, a single collectible, but the truth is that the token may contain a hash of the art, a pointer to the art, or both.<sup>178</sup> For some forms of NFTs, the token merely refers to the art file, which is stored separately.<sup>179</sup> (You can see this for yourself by right clicking on a piece of art on Rarible and noticing that you can save the image to your own computer.)

That the collectible consists of a token pointing to a work of art is not itself a problem for treating ownership of the collectible under the law of personal rather than intellectual property. After all, books and paintings have the same feature. But because the art to which the NFT is linked is digital—creating something that is digitally rare is the point, after all—the entire law of online copying applies. That includes the reproduction right. The reproduction right is not such a large deal offline for someone who wants to own just one thing. I am happy to own a book and not copy it. But online, reading the book makes a copy of it from ROM into RAM.<sup>180</sup> So does every other action with it—transferring it away from me to someone else, for example. As MP3 aftersales company ReDigi discovered when it was shut down by a federal lawsuit, even if I pass a digital file to you by sending one packet to you at a time and erasing that packet from my own hard drive so that there are never two copies at any one time, a court will still find that an infringement under copyright law.<sup>181</sup>

By way of comparison, consider the license conditions imposed by Axie Infinity. Although Axie Infinity expressly sells buyers the axies (creatures) themselves on the grounds that they are owned and may be resold for profit, the license conditions imposed by Axie tell an entirely different story. The license notes that all graphics (including those of the sold axies) are still owned by the company, and that the company operates under the law of the Cayman Islands:

Unless otherwise indicated, the Site and the App and the Smart Contracts are our proprietary property and all source code, database, functionality,

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177. *See id.*

178. *See* NBA TOP SHOT, *supra* note 90 (separating the ownership interests in the token and the art).

179. *See* Finzer, *supra* note 1.

180. *See* FAIRFIELD, OWNED, *supra* note 12, at 217 (“Turning on a Kindle and reading a Dan Brown novel should not involve copyright law.”).

181. *See* Capitol Recs., LLC v. ReDigi Inc., 934 F. Supp. 2d 640, 655 (S.D.N.Y. 2013) (deciding that the first sale doctrine would not apply in digital reproductions).

software, website design, audio, video, text, photographs, and graphics on the Site and the Apps (collectively, the “Content”) and trademarks, service marks and logos contained therein (the “Marks”) are owned, controlled by us or licensed to us, and are protected by copyright and trademark laws and various other intellectual property rights and unfair competition laws of the Cayman Islands, foreign jurisdiction and international conventions.<sup>182</sup>

The all-important copyright, the right to make reproductions that is absolutely necessary to convey a digital item from one person to another, is expressly retained by Axie. There is no limited exception for transfer and, indeed, owners cannot exploit their axes for commercial gain (which, under relevant internet law, emphatically includes reselling a digital asset for a profit, as domain name cybersquatters learned to their chagrin in the 1990s).<sup>183</sup> The choice of law provision is so error riddled as to be nearly incomprehensible, with the only emergent theme that users must vindicate their rights in an inaccessible and alien legal environment—the Cayman Islands.<sup>184</sup> The document limits the ability of any owner to make more than \$10,000 in merchandising from an axie without a licensing agreement,<sup>185</sup> which both limits the upside gain of the owner and directly contradicts the ban on commercial use elsewhere in the license. Finally, Axie claims the right to collect a commission of 4.25% on all forward sales of an axie.<sup>186</sup> The unmistakable impression left by the Axie terms of use is that Axie wishes purchasers to buy and pay premium prices as if they own axes but intends to claw back most of those promised ownership rights through the terms of use. What the terms promised to the buyer give, the terms of use take away, or would if the clawback were not so crudely done as to be likely unenforceable. This cannot be the basis for a stable market in digital personal property interests.

Such moves make the core claims of NFTs difficult to take seriously. Owners of NFTs of course do not own the right to make infinite copies of the art for which their token stands. But they have been ostensibly sold the right to act as if art that they *did* purchase were truly owned by them. That includes displaying it, using it, and selling

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182. See AXIE Terms of Use, *supra* note 56.

183. See *id.* (“[N]o Content or Marks may be copied, reproduced, aggregated, republished, uploaded, posted, publicly displayed, encoded, translated, transmitted, distributed, sold, licensed, or otherwise exploited for any commercial purpose whatsoever, without our express prior written permission.”).

184. See *id.* (“This Terms of Use and your use of the Site, the App, and the Smart Contracts are governed by and constructed in accordance with the laws of the Cayman Islands applicable to agreements made and to be entirely performed in the Cayman Island, without regard to its conflicts of law principles.”).

185. See *id.* (“An Axie NFT can be used to generate a maximum of \$10,000 in revenue before an official license agreement has to be signed. The revenue can come from either fanart (tokenized or physical) or merchandise (t-shirts, mugs, hoodies, etc.).”).

186. See *id.* (“In addition to the Gas Fee, each time you utilize a Smart Contract to conduct a transaction with another user via the App, you authorize us to collect a commission of 4.25% of the total value of that transaction (each, a ‘Commission’). You acknowledge and agree that the Commission will be transferred directly to us through the Ronin Network as a part of the transaction.”).

it. Those rights are free and clear offline. Ownership of an offline artwork entitles the owner to display it on a museum wall or in the drawing room, because no copy is being made. Online there is. Using a work offline involves no copyright at all. Looking at a painting or opening a book involves no copy being made. Online it does. Offline, selling something to someone else does invoke the copyright holder's distribution right, because of the "first sale" exception, limiting the copyright holder's power over distribution of the work to the first sale of that work. But offline that "first sale" right does not apply to works licensed rather than sold, and we cannot resell copies of software we purchase online, for example.<sup>187</sup>

This problem is readily found in the licenses accompanying purchases of NFTs. For example, by license, purchasers of an NFT are often not permitted to commercially benefit from their purchase or are limited in their ability to benefit to a set dollar figure. The CryptoKitty "Nifty License" permits owners of a CryptoKitty to use their kitty to promote their own merchandise, as long as they don't make more than \$100,000 per year doing so, a startling limit for a transactional form that expressly contemplates owners making money from what they own.<sup>188</sup> The various NFT licenses often permit an owner to display and sell copyrighted material linked to the token, but licenses do not provide an exception to the reproduction right, enabling those powers to actually be exercised without infringing copyright. The SuperRare license permits the owner of a piece of digital art to display and sell a piece of tokenized art but does not include exceptions to the duplication right, the "copy" right, that would enable owners to do so with a digital artifact.<sup>189</sup>

These problems are not limited to intellectual property interests linked to an NFT and conveyed by its transfer. For vendors who claim to convey ownership interests to wipe out the middlemen, NFT creation and vending sites retain enormous power over the context in which the NFT can be used. That power can and will be used to limit purchasers' power over their assets to levels far beyond, again, what an owner of personal property would have. Consider, for example, the above-referenced game, Gods Unchained, an NFT-based collectible trading card game that aggressively promotes player ownership and resale of cards as part of its "play to earn" pitch.<sup>190</sup>

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187. *Vernor v. Autodesk, Inc.*, 621 F.3d 1102 (9th Cir. 2010).

188. *See Terms of Use*, CRYPTOKITTIES, <https://www.cryptokitties.co/terms-of-use> [<https://perma.cc/BW6A-PGW7>] (last updated Nov. 15, 2018) (stating an owner of a CryptoKitty may license, copy, and display his or her own CryptoKitty for "purpose of commercializing your own merchandise" so long as that Commercial Use "does not result in you earning more than One Hundred Thousand Dollars (\$100,000) in gross revenue each year").

189. *See SuperRare Terms of Service*, NOTION, <https://www.notion.so/SuperRare-Terms-of-Service-075a82773af34aab99dde323f5aa044e> [<https://perma.cc/9FHK-XHU7>] (last updated Feb. 15, 2022) ("SuperRare items are *unique*, meaning that there should only ever be one digital token for a given Work of Art. Artist hereby acknowledges, understands, and agrees that Minting a Work on the Platform constitutes an express representation, warranty, and covenant that the Artist has not, will not, and will not cause another to Mint, tokenize, or create another cryptographic token representing a digital collectible for the same Work, excepting, without limitation, the Artist's ability to Mint, tokenize, or create a cryptographic token or other digital asset representing a legal, economic, or other interest relating to any of the exclusive rights belonging to the Artist under copyright law." (emphasis in original)).

190. *See GODS UNCHAINED*, <https://godsunchained.com> [<https://perma.cc/76AS-9B65>]

Cards in Gods Unchained consist of two elements: an NFT token which players can transfer directly between one another, and the intellectual property of the card which appears in the virtual tabletop.<sup>191</sup> Cards are sold through a marketplace provided by the game creator; cards are played within a virtual tabletop where the cards and card art appear and the card stats take effect. In a system like that, the player owns the token, but the game creator maintains control over what intellectual property can be displayed in the game space.<sup>192</sup> Indeed, if the creator of the game wanted to change the value of the card (and to be clear, such creators make money by claiming that they cannot change or take a token from an owner who buys it), they may do so by simply changing the card's art and attributes when it is played in the game space.

There is some hope for these issues. The analogy to physical personal property is clear and compelling. Courts are used to hearing about how a person owns one part of an asset, but merely benefits from a license in the other. For example, just as a book owner owns the physical copy and the author still holds the copyright, an NFT owner owns the token outright but merely benefits from a limited license in attached art. Courts have said intellectual property is licensed (not sold) if the company says the intellectual property is licensed.<sup>193</sup> That leaves open the opposite conclusion, that when a company intends to part with a digital copy, and says it sells an ownership interest, it does so.

There is also for the first time a financial incentive for companies to get this right. Until now, incentives for companies like Amazon have been to dance coyly around the language of ownership, getting customers to pay premiums to “buy” access to content that is in fact licensed. They are more likely to be disciplined in the market for recapturing power through license agreements or control over the context in which an asset is used. NFT creators have made promises that NFT purchasers are the owners of the property, and those words have weight for courts. More, NFT purchasers have clearly parted with enormous amounts of money on the grounds that the token represents something different than merely the attached resources. A GIF of LeBron James dunking is itself worthless. An NFT on Top Shot of LeBron James dunking is worth over \$230,000.<sup>194</sup> The purchaser is clearly paying for the part of the asset that they own, putting the transaction clearly outside of the mere licensing of intellectual property.

### III. A STABLE LEGAL FRAMEWORK FOR DIGITAL UNIQUENESS

Whether because of technological power retained by the NFT vendor (through wrapping, pausing, code in the transfer functions, or similar moves) or law (through

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(highlighting that the website is a “Play to Earn” platform).

191. See *Frequently Asked Questions*, GODS UNCHAINED, <https://godsunchained.com/learn/faq> [<https://perma.cc/K5SR-KD4G>] (discussing how the cards recognize a unique kind of ownership for the user).

192. See NBA TOP SHOT, *supra* note 90 (explaining that the user owns the token, but the company owns the art).

193. *Vernor v. Autodesk, Inc.*, 621 F.3d 1102 (9th Cir. 2010).

194. NBA TOPSHOT, <https://nbatopshot.com/transactions/top-sales> [<https://perma.cc/7YT3-WAJF>] (choose Top Sales) (reporting the highest sale of a Top Shot moment to be \$230,023 on August 25, 2021).



license clawbacks and arbitration clauses), the legal framework surrounding NFTs does not currently offer the kind of ownership interests that purchasers have been promised. They are a bad buy. For NFTs to succeed, lawyers must pick better analogies. I have argued throughout that the best legal characterization of an NFT sale is as a sale of personal property. A key step notably absent from the literature is, therefore, discussing how the actual law of sales of personal property, Uniform Commercial Code Article 2: Sales, would apply. That statute has a range of shovel-ready applications, a rich tradition of consumer protection, and a deep bank of caselaw. Courts also have a history of adapting its provisions to analogous circumstances on the internet.<sup>195</sup> The use of sales law over IP arrangements better matches the expectations of NFT consumers and vendors. Aligning legal and commercial expectations is what makes for well-run, efficient, and fair markets.

A further step is even more important. The intellectual property license is the dominant legal paradigm for legal relationships between people and assets online.<sup>196</sup> As we have seen, it is not the only available analogy, and in fact when it comes to sales of non-fungible tokens, IP licenses are the wrong one. The development of an alternative grounding example will help courts roll back the overextension of intellectual property interests online. NFTs are unquestionably personal property. Some of them relate to intellectual property interests, to be sure, but many do not, and the conveyance of the interest is clearly in personal property terms. It is important therefore to develop the legal theory around NFTs in order to provide a foundational and grounding example of personal property online on which other analogies might rest. A particularly valuable knock-on effect of establishing a strong legal narrative surrounding NFTs will be to help pry internet legal theory away from doctrine and analogies that have impeded its growth and development.<sup>197</sup>

### *A. Picking Robust Legal Analogies*

#### 1. Sales of NFTs

UCC Article 2 governs sales of goods, which are “all things . . . which are movable at the time of identification to the contract for sale.”<sup>198</sup> Courts adapt Article 2’s provisions to new forms of sales. The Uniform Commercial Code notes that its remedies “must be liberally administered,” and the Code as a whole must be “liberally construed and applied to promote its underlying purposes and policies,” and thus “[u]nless displaced by the particular provisions of [the Code], the principles

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195. See *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447, 1452–53 (7th Cir. 1996) (applying Article 2, Sales, to sales of software).

196. See Aaron Perzanowski & Jason Schultz, *Reconciling Intellectual and Personal Property*, 90 NOTRE DAME L. REV. 1211, 1213–14 (2015) (explaining the dominance of IP agreements online).

197. See *FAIRFIELD, OWNED*, *supra* note 12, at 243 (“The solution is not just to move the tool of intellectual property further away from the judge’s groping hand, but to nudge the tool of traditional property closer. The solution is not just to pare back intellectual property overreach, but to foster growth of old-fashioned ownership interests in intangible property of all sorts.”).

198. U.C.C. § 2-105(1) (AM. L. INST. & UNIF. L. COMM’N 2002).

of law and equity . . . [and many other rights] supplement its provisions.”<sup>199</sup> Courts have long extended Article 2’s provisions to sales of digital assets and software, particularly if the sale looks like a purchase of a physical object. For example, if you purchase a computer or a video game in Best Buy, the purchase is governed by Article 2, even though the underlying asset enjoyed by the purchaser is a software license.<sup>200</sup> Courts have routinely applied Article 2 to consumer purchases of computer hardware loaded with software, or with software itself.<sup>201</sup>

Applying the framework of Article 2 Sales to NFT sales would have four salutary effects. First, it would clarify the role of contract law in conveying the property interest and clear up much of the confusion surrounding the unfortunate language of smart contracts.<sup>202</sup> Second, it would extend much-needed consumer protection measures (including the powerful and flexible implied warranty of merchantability) to NFT sales. Third, it would provide a strong analogy to help courts resist the characterization of NFT sales as mere licenses, in which a purchaser who buys an NFT in fact receives no more legal right in the asset than does someone who rents a movie online. And finally, framing NFT sales within the law of sales of personal property would offer buyers some protection from the unilateral imposition of contract terms that strip them of most legal rights. The following Sections address each in turn.

## 2. Clarifying Contract’s Role

One of the key problems with viewing NFTs as fundamentally creations of contract and license is the overreach of licensing law online.<sup>203</sup> Consider an NFT linked to a piece of art. Courts could characterize the transfer of the NFT as merely effecting a transfer of a nonexclusive license in the asset, or they could conclude that the transaction was the sale of the asset, which includes certain owners’ exemptions permitting the owner to display or sell the asset.<sup>204</sup>

Treating NFT sales under Article 2 would clarify the different domains in which contract law and property law must operate in the sale of NFTs. A purchase of personal property has two components: a contract to convey the property, and the

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199. *Id.* §§ 1-305, 1-103(a)–(b).

200. *See Hill v. Gateway 2000, Inc.*, 105 F.3d 1147, 1148–49 (7th Cir. 1997) (finding that under Article 2 of the UCC, a consumer who purchased a computer may be bound by terms included with the product once the consumer has the opportunity to open the product and reject the terms by returning the product); *Zeidenberg*, 86 F.3d at 1452–53 (7th Cir. 1996) (concluding that under Article 2 of the UCC, terms inside a box of software bind consumers who use the software after an opportunity to read the terms and to reject them by returning the product).

201. *See Hill*, 105 F.3d at 1148–49; *Zeidenberg*, 86 F.3d at 1452–53.

202. *See supra* Section II.A.1.

203. *See PERZANOWSKI & SCHULTZ, END OF OWNERSHIP, supra* note 150, at 174 (“But even if courts insist on the license-as-contract framework, bringing contract law to its senses is another way to chip away at the edges of the ownership problem.”).

204. *See* 17 U.S.C. § 109 (establishing the owner’s right to sell and display an item that includes intellectual property after its first sale).

property interest itself.<sup>205</sup> Conceptualizing the transaction as a contract for the sale of personal property cabins contract law to its proper place.

The rules of contract formation under Article 2 are simple and powerful.<sup>206</sup> Article 2 abolishes the requirement that offers and acceptances mirror each other, which matters when buyer and seller are firing off various electronic messages and embedding terms in purchasing algorithms, which is covered more below.<sup>207</sup> A contract under Article 2 does not need to be formed at a specific time, and any means memorializing the contract will do.<sup>208</sup> The terms of the contract are not set by one party, but by merging and comparing the contractual terms proposed by both parties.<sup>209</sup> This flexibility pays off especially when contracts are formed by new technological means and through conflicting legal assertions. Article 2 can find a contract in the parties' conduct, even if no contract writings are exchanged at all.<sup>210</sup> UCC Article 2-204 permits contracts to be formed "in any manner sufficient to show agreement, including conduct by both parties which recognizes the existence of such a contract."<sup>211</sup> This in effect adds contractual protections to unspoken agreements. For example, the purchase of a jug of milk in a supermarket results in a contract for the sale of goods without a word spoken or written between supermarket and customer. Similarly, in the event of an NFT sale, the actions of the parties will result in a contract even if the parties exchange no other information. One party exchanges cryptocurrency for the other party's NFT: a contract has been formed.

### 3. Consumer Protection and Implied Warranties

Article 2 balances its powerful and flexible rules of contract formation with robust consumer protections by investing the contracts it creates with implied warranties that come with every contract and that assure buyers that the property they purchase meets certain minimum standards.<sup>212</sup> UCC Article 2 offers three warranties of note: title, merchantability, and fitness for a particular purpose.<sup>213</sup> Each would fit nicely within the framework of reasonable promises made about an NFT: warranties of title speak to the digital descent of the NFT and whether the actions of the seller caused a cloud on title.<sup>214</sup> This is particularly important because NFT transfers are not reversible as a matter of technology. Once a transfer of a token has been hashed to the blockchain, only the owner of the account that holds the token can further transfer

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205. See Christina Mulligan, *Licenses and the Property/Contract Interface*, 93 IND. L.J. 1073, 1082 (2018) (noting that licensing permits courts to opportunistically characterize a transaction as a contract or as property depending on the desired outcome).

206. U.C.C. § 2-204 (AM. L. INST. & UNIF. L. COMM'N 2002) ("A contract for sale of goods may be made in any manner sufficient to show agreement, including conduct by both parties which recognizes the existence of such a contract."); see also *id.* §§ 2-206–2-207.

207. *Id.* § 2-207(1).

208. *Id.* § 2-204(2).

209. *Id.* § 2-207(3).

210. *Id.* §§ 2-204(1), 2-206–2-207(3).

211. *Id.* § 2-204(1).

212. *Id.* §§ 2-314, 2-315.

213. *Id.* §§ 2-312, 2-314, 2-315.

214. See *id.* § 2-312.

it. If a cloud on title arises because of a fraudulently induced trade (or hack, or what have you), a warranty of title gives downstream purchasers a cause of action against the seller.<sup>215</sup>

Under UCC Article 2-314, sales by a merchant who regularly sells goods of a given type come with an implied warranty of merchantability.<sup>216</sup> That warranty states that the good is of fair or average quality and will pass without objection in the trade.<sup>217</sup> So, for example, a sale of a car by a dealer would include an implied warranty of merchantability that the car will be of average quality for a new car, if it is new, or a used car, if it is used. The flexibility of the warranty is in its enforcement of average quality.<sup>218</sup> This warranty could be easily and effectively applied to NFT sales. An implied warranty of merchantability would speak to whether the token functions as intended—unlocks the smart car or transfers ownership and access to a digital piece of art, book, CryptoKitty, and so forth. Tokens that do not function, do not unlock assets, do not point to the artwork they purport to convey, and so on, would not pass without objection in the trade, as the warranty of merchantability requires. And the warranty of merchantability would only impose those obligations on sellers who routinely sell such assets and thus would know their fair average quality. Nonmerchant sellers could simply dispose of their assets without concern for the warranty. The warranty would therefore act as an important counterbalance to power and information asymmetry in the NFT market. Those who know and make a living from the sale of NFTs would be held to the standard of the warranty, while those who merely purchase the assets and sell them occasionally to someone else would not.

The related UCC Article 2-315 implied warranty of fitness applies where a seller is aware of the buyer's particular requirements and that the buyer relies on the seller to select the good.<sup>219</sup> In such circumstances, there is an implied warranty made by any seller that the object sold will be fit for that particular purpose.<sup>220</sup> Again, the warranty could provide significant protection to NFT buyers. Imagine a seller who sells a hash to a buyer despite knowing that the hash is part of a fraudulent fork of a blockchain, or that the hash has been wrapped in another smart contract such that the collectible appears valuable but in fact is not recognized by anyone else.<sup>221</sup> Even where the seller is not a merchant, if she knows that the buyer has a given purpose for the NFT and that the NFT is not fit for that purpose, she is liable to the buyer for breach of the warranty.<sup>222</sup> For example, a seller would be liable for breach of contract for the sale of an NFT playing card in *Gods Unchained* if the seller knew that the card had been paused in game and knew that the buyer was buying the card for use in game.<sup>223</sup>

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215. *See id.*

216. *Id.* § 2-314.

217. *Id.*

218. *See id.*

219. *Id.* § 2-315.

220. *Id.*

221. *See supra* Section I.C.

222. U.C.C. § 2-315 (AM. L. INST. & UNIF. L. COMM'N 2002).

223. *See supra* Section I.C. for discussion of pausing.

To the extent that UCC provisions guaranteeing clean title and warranties impose transaction costs, the underlying distributed ledger technology allows the transactions to flow smoothly. The chain of title is secured to the blockchain and is difficult to fake, making it easy to guarantee that there is no cloud on title and that the vendor is selling what they promise to be selling. But there remain instances where law must still secure title. For example, if fraudster F fraudulently induced seller S to part with an NFT, and then F sold the NFT to buyer B, B's rights in the NFT as against S would be established by the UCC's provisions on bona fide purchasers, and B's rights to sue F for breach of warranty of title would be secured by the UCC's warranty of title.<sup>224</sup>

#### 4. Sales Versus License Characterizations

Using sales law to govern NFT transactions will further help courts avoid pure license characterizations, which have plagued digital objects. Imagine if a bookstore attempted to sell a book purely as a license. A court would still hold that the physical book had been sold even if the intellectual property inside were licensed.<sup>225</sup> The court would not enforce license agreements for physical books that imposed terms of use on the reader. The physicality of the book would keep courts from recognizing such restrictive licensing agreements. The unique and non-fungible nature of tokens should lead courts to treat NFTs in a similar fashion to how they treat physical books. Sales law can help with this characterization.

The core question is what courts will do when NFT vendors and minters attempt to claw back ownership interests they have sold by asserting terms hidden in Terms of Use, End User License Agreements, or even legal language buried deep in the NFT smart contracts themselves. That is, what will happen when NFT vendors act—and they will—the same way that Kindle does with respect to true ownership of digital property.<sup>226</sup>

The question courts will face is what kind of contract is involved.<sup>227</sup> The key feature of a license contract is that the rightsholder continues to exercise power over the licensee, and, at the end of the contract duration, the licensee has nothing. The key feature of a sales contract conveying a property interest is that once the sale is concluded, the seller has no power over the buyer. Once the buyer pays and the seller hands over the property, the deal is concluded.

This characterization is extremely significant for sales of NFTs. Recall that NFTs are sold to purchasers on the premise that they may be resold and that upstream sellers cannot interfere with downstream purchasers' rights. At the same time, as

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224. See U.C.C. §§ 2-403, 2-312 (AM. L. INST. & UNIF. L. COMM'N 2002).

225. See Perzanowski & Schultz, *supra* note 196, at 1214–15 (noting the impact of tangibility on court determinations of owner rights).

226. See Aaron Perzanowski & Chris Jay Hoofnagle, *What We Buy When We Buy Now*, 165 U. PA. L. REV. 315 (2017); Aaron Perzanowski & Jason Schultz, *Digital Exhaustion*, 58 UCLA L. REV. 889 (2011) [hereinafter Perzanowski & Schultz, *Digital Exhaustion*].

227. See Mulligan, *supra* note 205, at 1075 (“Because EULAs appear to have characteristics of contracts and of instruments that transfer property, lawyers, judges, and legislators can unconsciously find themselves switching between intuitions that EULAs should be treated as one or the other.”).

above, the intellectual property licenses that accompany NFTs are much the same as those which govern Google Play movies or Kindle eBooks. Getting the analogy right is of paramount importance for NFTs to be able to do what they were sold to do: pass freely in personal property aftermarkets for the profit and benefit of purchasers rather than original sellers.

If courts consider the sale of an NFT to be analogous to the licensing of software, the very sales rights that drive interest in NFTs will be imperiled. Consider the Ninth Circuit's decision in *Vernor v. AutoDesk, Inc.*<sup>228</sup> There, the question was whether a buyer of software could resell that software despite shrinkwrap license conditions that prohibited the buyer from resale. If the transaction were a true sale of the software, the new owner would have been able to sell it forward to another user. If the transaction were a license of software, the licensor could prevent the licensee from transferring that license to anyone else. The court in *Vernor* found that the characterization of the parties was dispositive, that *calling* the transaction a license made it one. Thus, the court focused on

three considerations that we may use to determine whether a software user is a licensee, rather than an owner of a copy. First, we consider whether the copyright owner specifies that a user is granted a license. Second, we consider whether the copyright owner significantly restricts the user's ability to transfer the software. Finally, we consider whether the copyright owner imposes notable use restrictions.<sup>229</sup>

Note what makes a "sale" of software a license rather than a sale<sup>230</sup>: the seller's characterization. If the seller *says* it is a license in a "license contract," if the seller claims to have limited the buyer's rights in the software, and if the seller claims to have limited transfer of the buyer's transfer rights, a court drawing inspiration from *Vernor* and similar cases will find that the transaction was in fact one in which the seller granted the buyer a mere license. Thus, the seller could continue to exercise control over what the buyer did with the software even after the copy was bought and fully paid for.

Under the surface, *Vernor*'s arguments are quite unpersuasive. For example, if a copy of software were truly sold, not licensed, then the seller would be *unable to enforce* the purported transfer restrictions or use restrictions. The owner of software would have the right to sell it regardless of the seller's claims. So, the idea that a court should characterize the transaction as a license rather than a sale, because the seller attempted to impose transfer restrictions that would be invalid if it were a sale, shows the court's circular and rather inept analysis. And note, above, that a *Vernor* analysis would gut the very purpose of the NFT sale, which is to transfer the right to resell and profit from the rise in value of an NFT to the buyer, rather than retain it in the hands of the seller.

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228. 621 F.3d 1102 (9th Cir. 2010).

229. *Id.* at 1110–11.

230. *See* Mulligan, *supra* note 205, at 1075 (noting that licensing permits courts to opportunistically characterize a transaction as a contract or as property depending on the desired outcome).

But if the analogy is to sales of physical objects, a *Vernor* analysis becomes one step more distant. A court would not hold that the sale of a book was a sale *or* a license; it would determine that it was a sale *and* a license. The physical copy of the book serves as an anchor to the court's legal characterization of that part of the transaction as a sale.<sup>231</sup> In the same way, the token itself serves to anchor the characterization of the transaction as a sale, even though it concerns an entirely digital object.

There are compelling policy reasons to do so. People purchase NFTs with the expectation of capturing the value of resale. NFT buyers expect—as do crypto-enthusiasts broadly—that the technological and legal framework will give them *more* power vis-à-vis prior owners, middlemen, and other institutional actors, not less. Just as the owner of bitcoin expects to be free of banks and financial regulators when she pays the bitcoin to someone else, so the owner of an NFT expects to be free of upstream owners, the creator of the NFT, and anyone else when she uses, displays, or transfers the NFT to someone else. Thus, there is reason to believe that when courts confront NFT sales, they will be less sanguine about imposing a structure that purports to sell broad ownership to the buyer, but in fact claws back those interests through provisions in contracts, website Terms of Use, or software End User License Agreements. The economic reality of an NFT sale is that it is the sale of personal property, not a lease, license, or other transaction designed to extend the control of the vendor over the buyer through the asset.

### 5. The Battle of the Algorithms

Finally, analogies to sales law will help resolve a serious developing problem in the sale of both cryptocurrencies and NFTs: a Battle of the Algorithms. Under the law as it is, humans contract at a disadvantage with machines. Consider ordering something from Amazon. If Amazon's web server communicates contract terms to you, you are bound by them when you click "buy now." But if you were to communicate terms back to Amazon's web server, a court would most likely ignore them, reasoning that the server was not programmed to accept what you had sent, and no human saw the terms. The result of this power of machines to dictate contract terms to humans is that almost every online contract contains an arbitration clause—an agreement that the buyer gives up her right to go to court—and must instead proceed to arbitration, where consumers rarely receive redress.

This problem is now being imported into sales of cryptocurrency and NFTs. A framing example will help clarify. In *Rensel v. Centra Tech, Inc.*, the Southern District of Florida was asked to determine whether a buyer, who purchased cryptocurrency by paying ether into a smart contract, was bound by the terms of an arbitration agreement that appeared on the seller's website.<sup>232</sup> The court ruled that since the buyer had purchased the cryptocurrency directly through the smart contract rather than through the website, he was not bound by the website arbitration

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231. See Perzanowski & Schultz, *Digital Exhaustion*, *supra* note 226, at 901 ("The benefits of first sale have traditionally depended on a single trigger: ownership of a copy of a work.").

232. See *Rensel v. Centra Tech, Inc.*, No. 17-24500-CIV, 2018 WL 4410110, at \*12 (S.D. Fla. June 14, 2018) (deciding that the arbitration agreement did not apply because there were no buttons to click or boxes to check).

agreement.<sup>233</sup> Although the case and holding are straightforward, they raise a number of interesting questions. First, it is almost certain that based on such holdings, vendors will embed the terms of the contract, including arbitration provisions, within the smart contract itself. It remains a question as to whether contract terms buried that deeply will be enforced.<sup>234</sup>

A second means of solving this problem, and one that is uniquely enabled by blockchain smart contracts, is that both buyer and seller may use a smart contract to execute the purchase.<sup>235</sup> We have already discussed a seller's NFT smart contract, programmed to accept cryptocurrency and vend an NFT to the buyer. A buyer can do something similar. Consider a buyer's smart contract, funded with ether, and programmed to purchase an NFT once it reaches a given price. Such a contract might watch prices through a site or service external to the blockchain (called an oracle) and make the purchase when the price is right.

Imagine that two such smart contracts interact: one a purchase contract tied to a cryptocurrency wallet set to buy NFTs at a set price, the other a smart contract set to sell an NFT at a given price. Both can argue that the code is the contract; in fact, both may have non-code legal terms as part of their agreement (things like "by transferring cryptocurrency to this contract, you agree to the following terms and conditions"). The key term on which buyer smart contracts and seller smart contracts are likely to disagree is arbitration. Assume, then, that the buyer smart contract expressly banned arbitration, and the seller contract attempted to impose it.

Such situations will increase in frequency, and the solution to the problem can be found in sales law. Uniform Commercial Code Article 2-207 provides for the formation of enforcement of contracts where the offer differs from the acceptance. The famed "Battle of the Forms" provision states that when both buyer and seller proffer different sets of legal terms, yet act as though the contract were concluded, the contract consists of the terms on which the writings of the parties agree and does not include terms on which the writings of the parties disagree or, in most cases, where one party is silent on a term.

The Battle of the Forms provides both practical and theoretical guidance for dealing with algorithm-to-algorithm contracts. Algorithmic trading is now standard in equities markets, both on the seller's and the buyer's side, so the prospect of buyers' and sellers' contracts engaging in high-speed NFT transactions on more or less the same grounds (that the NFT in question is expected to rise or fall in value) is entirely predictable. When such cases start to emerge, the "last shot" rule will be a bad rule of decision.

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233. The idea that one loses all right to go to court by simply browsing a website is both widely adopted law and rank nonsense, about which much ink has been spilled elsewhere. See NANCY S. KIM, *CONSENTABILITY: CONSENT AND ITS LIMITS* 33 (2019) (detailing the systematic attempts of companies to deprive consumers of their right to go to court through mandatory arbitration).

234. See generally *Kauders v. Uber Techs., Inc.*, 159 N.E.3d 1033, 1055 (Mass. 2021) (finding that the online contract did not manifest assent).

235. See Joshua Fairfield, *Smart Contracts, Bitcoin Bots, and Consumer Protection*, 71 WASH. & LEE L. REV. ONLINE 35, 44-46 (2014) (arguing that consumer-proffered smart contracts could counterbalance the power of mandatory agreements offered by sellers).



The mixture of wallet-enabled smart contracts and the Battle of the Forms will protect NFT buyers from losing their legal rights when smart contracts both buy and sell NFTs. Most important will be for buyer-side smart contracts to exclude arbitration by express language. Where buyer and seller are merchants, it is possible under UCC Article 2-207(2) that if one smart contract is silent on arbitration and the other inserts the term, it is likely that a court will deem the arbitration agreement not material and include it in the contract.<sup>236</sup> Expressly excluding arbitration will cause the terms to knock each other out, and the buyer will retain her right to go to court. The same is true of warranty disclaimers. Assuming, as NFT contracts already do, that sellers will attempt to disclaim all warranties and limit remedies, language in the buyer's smart contract reserving all warranties and preserving remedies will knock out the disclaimers and limitations, preserving the buyer's right to an effective remedy.

### *B. The Need for Strong Personal Property Analogies*

When we buy a car, we consider its resale value. An art buyer considers whether the art will go up in value on resale. Students seek to resell their university texts, to recoup a part of their investment. But when we try to create that same system online, there are real problems. Consider ReDigi, a company that attempted to permit users to sell their used MP3s.<sup>237</sup> Users uploaded their MP3s to the ReDigi website, and the original was deleted from their computer.<sup>238</sup> Upon purchase, a user would download the MP3, while the stored version was deleted as each packet was transferred.<sup>239</sup> The deletion method ensured that there were never two copies of the work at the same time.<sup>240</sup> While ingenious, the technological attempt to simulate rivalrousness and uniqueness of a given copy failed to convince the court. In *Capitol Records, LLC v. ReDigi Inc.*, the court determined that the transfer of the asset nevertheless created a copy, even though the original was deleted.<sup>241</sup> This copy then violated the reproduction right of the IP rightsholder, and ReDigi was secondarily liable for enabling the infringing conduct of its users.<sup>242</sup> ReDigi shut down, and to date the digital equivalent of a used record store does not exist.<sup>243</sup>

To reach this result, companies used carefully drafted license contracts to negate the powers reserved to owners of property. For example, if I buy a physical copy of a book, I may sell it at a secondhand bookstore, even if the owner of the copyright in the book wishes to stop me.<sup>244</sup> The drafters of the Copyright Act favored retaining

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236. See U.C.C. § 2-207(2) (AM. L. INST. & UNIF. L. COMM'N 2002).

237. *Capitol Recs., LLC v. ReDigi Inc.*, 934 F. Supp. 2d 640, 641–46 (S.D.N.Y. 2013).

238. *Id.*

239. *Id.*

240. *Id.*

241. See *id.* at 655 (“[T]he first sale defense is limited to material items, like records, that the copyright owner put into the stream of commerce. Here, ReDigi is not distributing such material items; rather, it is distributing reproductions of the copyrighted code embedded in new material objects.” (emphasis omitted)).

242. *Id.*

243. See *id.*

244. See PERZANOWSKI & SCHULTZ, *END OF OWNERSHIP*, *supra* note 150, at 1–3.

things like libraries and used bookstores, so that aftermarkets in consumer goods could be protected against takeover from copyright holders. The key move was to give a distribution right to owners. The copyright holder's right to control who may distribute a copy ends after the "first sale."

But things did not turn out that way online. Courts conflated the digital distribution right with the reproduction right. Computers transfer things by making copies from one computer to another. She who controls the reproduction right controls digital assets. And because courts consider even the most functional of copies—say, the copy a computer loads from ROM into RAM—to be a copy under the meaning of the act, the copyright holder is empowered to impose all kinds of conditions on use that she could not impose had she sold a physical copy.<sup>245</sup> For example, where a condition requiring a user to stand on her head while reading a physical book would not invoke any question of copyright, a license requiring a user to stand on her head while reading an e-book would be. If the user does not do as the license requires when using the e-reader, she is a copyright infringer. The computer operates the product by making copies, as courts have interpreted things, and thus any copies made must fall within the conditions of the license.

The ownership-elimination project has been so successful online that companies now link online assets to offline ones in an attempt to seize the value of the aftermarket.<sup>246</sup> For example, my students' law books now come with codes tied to online versions of the book and other resources, in an attempt to reduce the resale ability of law textbooks. And as any student can tell you, used books are a source of huge savings.

The end result: ownership of consumer products online is weak and hazy, all but gone. This is how Apple and Google want things to be. But now comes the problem. What if one *wanted* to create an aftermarket in virtual property? What if, like artists who sell paintings into a market that expects some paintings to appreciate in value, the source of value to the original seller is enhanced by the fact that there is a robust aftermarket in the asset? This is, after all, what cryptocurrencies do: they aim to create a community of value. This is what initial coin offerings do. They seek to create value by creating demand. The promise is that the rise in value in the tokens will be captured by the owner of the token.

There is significant unmet market demand for digital personal property. That is, for example, what bitcoin does: it thrives on aftermarket demand for bitcoin.<sup>247</sup> Owners expect to capture any rise in their property's value and to be able to sell the property to the next purchaser. Thus, the initial purchase (the market) is less the point than the later sales (the aftermarket). For many NFTs, the aftermarket is the entire

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245. See *supra* notes 166–171 and accompanying text for discussion on RAM Copy Doctrine.

246. For example, General Mills tied downloading coupons or using its online communities to remove consumers' right to sue for damages caused by eating its cereal. See Stephanie Strom, *General Mills Reverses Itself on Consumers' Right to Sue*, N.Y. TIMES (Apr. 27, 2014), <https://www.nytimes.com/2014/04/20/business/general-mills-reverses-itself-on-consumers-right-to-sue.html> [https://perma.cc/RVQ2-F7DF].

247. An aftermarket is the value an item has after it has been sold. When a person buys bitcoin, she often hopes that it will rise in value, and that she can capture that value upon resale.

point. A buyer of a piece of art, trading card, or unique digital pet expects to be able to profit from its rise in value.

The creator of the system has significant control over the asset because they are able to ban or control access to the service or site in which the asset is used. For some assets this restriction is lifted by license. For example, the license that controls the intellectual property interests in CryptoKitties specifies that the owner of the token may use the intellectual property associated with the CryptoKitty in any other site that makes use of the tokens. So, while the CryptoKitties website itself is a game of breeding CryptoKitties, perhaps another site or service creates a game of racing CryptoKitties. In such circumstances, the ownership of the originating site or service would have attenuated control because the token would still work in other systems along with its attached IP. But in the vast run of NFT markets, control over the application, site, or service in which the asset derives meaning can be easily leveraged back into control over the asset itself. For example, the Terms of Use/EULA that governs the use of axies (tokenized fantasy animals much like CryptoKitties) expressly reserves the right to remove or ban players from the site or service. That can also include changing the attributes on the axies, because the way the site or service interprets the characteristics of the axies can change.

Purchasers of NFTs believe the hype: they have been told that they are the owners of valuable, unique digital assets, and that they can capture the rise in value of these assets as an owner would. But the structure of the markets in which NFTs are appearing give the lie to that promise. The legal framework for aftermarkets should depend on whether the market-maker is trying to sell buyers on the rise in value in the aftermarket. The current legal regime has been shaped by two decades' worth of efforts to eliminate aftermarkets online. That effort has been too successful. Consider, for example, the Axies terms of use listed above. Everything that is promised by NFTs—purchaser ownership and robust aftermarkets—is taken back in the terms of use and license agreement. The creator of the supposedly decentralized and distributed system is actually profoundly centralized, requiring users to agree to terms or be removed from the site, service, or even interaction with the ownership smart contract, the very list of who owns what that determines ownership of the asset.

### *C. Grounding Examples*

Courts need a grounding narrative to achieve stable aftermarkets for digital personal property. Law proceeds by analogy, and technology law is no different.<sup>248</sup> The claim that law cannot keep up with new technology is rank nonsense. When we regulate technology, we regulate its use by humans, not the physics or electronics behind the tech.<sup>249</sup> A murder is the same, whether by axe, sword, rifle, or phaser. The trick to updating law to keep up with technology is to find grounding examples; to enable courts to say, for example, that the privacy protections enjoyed by snail mail ought to be extended to email. The grounding example of a letter helps us get the law of online privacy right.

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248. See Sunstein, *supra* note 159, at 742 (arguing that law's method of analogical reasoning leads to correct results).

249. See FAIRFIELD, RUNAWAY TECHNOLOGY, *supra* note 157, at 75.

Compare, though, the transition of contract online to the transition of personal property online. Contracts jumped the digital divide effortlessly. A contract is enforced similarly whether written on paper or stored electronically. Indeed, far from saying that online contracts don't work, courts enforce them with added vigor. But digital personal property has not yet emerged. This is nothing sort of shocking, given both the importance of property in the U.S. legal system and the public's imagination, and the meteoric rise in use and importance of digital assets.

As discussed above, what has been lacking is a grounding example, a clear win for digital property, that establishes it above and beyond questions of intellectual property. A grounding example means that courts will begin with the understanding that an asset is digital personal property and then work outward to find the limits of that interest and where it overlaps with or conflicts with intellectual property. By contrast, courts now begin with the assumption that what is digital is intellectual property, and then work outward from that conception. Personal property interests (here, for example, consider to what degree you really own your smartphone) only exist at the periphery, where licenses do not occupy the space. Starting from that conception means that personal property interests in digital assets remain a theoretical possibility, but never a legally embraced practical reality.

If they succeed, NFTs will play an important part in establishing digital personal property. The analogy is too clear for courts to ignore. The NFT is sold with precisely the rights of ownership—to use, exclude others from using, profit from resale, or even destroy—that come attached to real-world ownership. Those representations to buyers, along with the form of the transaction, the prices paid which reflect an ownership premium, and the behavior of buyers and sellers after the NFT is sold, all point toward personal property as the best legal characterization of NFTs. And once established, NFTs themselves will ground further analogy. Courts and regulators are increasingly determining that bitcoin is property.<sup>250</sup> That example grounds the treatment of tokens generally as personal property. NFTs, once they are firmly characterized as digital personal property, will further strengthen the set of examples of digital personal property.

In particular, NFTs will help introduce a concept of digital personal property—like bitcoin—that can coexist alongside intellectual property interests.<sup>251</sup> A personal property interest in a digital asset must be particularly clear and distinct to avoid being subordinated to intellectual property interests.<sup>252</sup> In the offline context, the physical copy served as the grounding component for the personal property interest, as compared to an intangible intellectual property interest.<sup>253</sup> When everything is

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250. See, e.g., I.R.S. Notice 2014-21, 2014-16 I.R.B. 938 (“For federal tax purposes, virtual currency is treated as property.”).

251. See Perzanowski & Schultz, *supra* note 196, at 1214 (“First, content owners, particularly in the software industry, have endeavored to eliminate the personal property interests of consumers, redefining the notion of ownership by characterizing their transactions with consumers as licenses to use the works or the purchase of a license as opposed to the purchase of a copy.”).

252. See Mulligan, *supra* note 205, at 1094 (noting how license characterizations can be used to limit property powers such as transfer).

253. See Perzanowski & Schultz, *supra* note 196, at 1214 (“[T]he tangible copy is rapidly disappearing from copyright markets.”).

digital, courts fail to grant a personal property interest in the copy that can stand against interests granted in the copyright. They overlook the ownership of the copy in their eagerness to discern the extent of copyright license.<sup>254</sup>

NFTs provide a case for establishing strong digital personal property interests. The token is personal property. Whatever a court decides about the relationship between the token and any related intellectual property, it cannot avoid the fact of the token. The token grounds the property interest online just as the physical copy grounds it offline. Something must be done with it, and courts will choose to treat it as personal property.

The ramifications of having a grounding digital personal property interest that can resist being absorbed in intellectual property licensing will be profound for digital commerce. Many things already sold are more analogous to an NFT than they are to pure intellectual property licenses, yet they are assigned to the latter characterization by default. Digital property in games, Kindle eBooks, purchased movies and music, fully bought-and-paid-for software are currently treated exclusively under the law of intellectual property. But once courts widely acknowledge and enforce personal property interests in non-fungible tokens, the analogies will cascade, opening courts to a better understanding of what people own when they buy fully digital assets.

#### CONCLUSION

If NFTs had existed at the time of the internet's founding, legal interests in personal property would have translated as seamlessly as did contractual or intellectual property interests. It took thirty years to create the technological basis for unique digital personal property. In the meantime, intellectual property rightsholders and platform controllers exerted stranglehold control over personal property interests, squeezing them out in Terms of Use, End User License Agreements, and other "I Agree" contracts.

NFTs are, therefore, far more than a niche technology supporting online collectibles. They are a clear example of a purely digital interest sold as personal property. NFTs contain a component, the token itself, that is conceptually distinct from the abstract intellectual property rights. The token demands legal characterization, and the obvious legal characterization is personal property. NFTs therefore stand as a new and powerful grounding example of digital personal property, one that is capable of resisting the dominant online narrative whereby assets that are supposedly "sold" to consumers are in fact merely licensed.

That grounding example is particularly important because it connects courts to robust and well-thought-out legal precedent. A sale of an NFT is a sale of personal property—a good. Courts can therefore draw on the well-established and carefully thought-over law of Article 2 Sales in determining rights surrounding NFTs. That law either solves or suggests powerful and flexible solutions for issues currently haunting NFTs: consumer protection, warranties, disclaimers, and, most importantly, whether buyers of NFTs will have the legal right to go to court at all, or whether they will be forced into arbitration under the law of the Cayman Islands, for example.

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254. *Id.*

NFTs lay the groundwork for fixing one of the oldest problems of the internet. The internet threatened intellectual property because it is a technology that operates by making infinite, cheap, identical copies. It took over two decades to develop a technology that brought uniqueness back to the internet, by which digital assets were no longer fully duplicatable with the click of a button. If NFT technology had been available at the advent of the internet, law would have taken a vastly different arc, and we would own our Kindle eBooks, Google movies, and digital art. It is time for a late-breaking course correction. As NFTs join the small but growing stable of digital personal property interests, the course of law will bend to follow, enabling robust aftermarkets in digital property, lending based on digital assets as collateral, and other means of building wealth for individual owners. The urge to own, invest in, display, and resell unique items will drive a shift in not merely what we own, but how we own online.