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**CREATING TRUE DIGITAL OWNERSHIP WITH THE
“FIRST SALE” DOCTRINE**

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I. INTRODUCTION

After emerging in 1983, the internet fundamentally transformed society by enabling people to generate an abundance of information and instantly share it with the rest of the world. As countries moved online, people realized they could send millions of files and messages at unprecedentedly low cost—this made the internet a truly exceptional technology.¹ However, while one could “Copy, Paste” any file, one could not create digital information that was inherently resistant to duplication.² For example, valuable property like money, music, or art could not yet exist as entirely digital assets since they could simply be copied endlessly, deemed the “double-spend” problem.³

Computer technologists suffered the “double-spend” problem, wherein “[u]nlike physical cash, a digital token consists of a digital file that can be duplicated or falsified.”⁴ No digital asset could be “spent” (or sent) anywhere without ensuring that its sender could not resend the same digital asset to another destination, hence “double-spending.”⁵ This seemingly trivial problem barred the existence of scarce digital assets that require resistance against unwarranted duplication, like money or art. However, blockchain technology now provides a means to bring such property online by ensuring scarcity through clever code and cryptography.

By solving the double-spend problem, and thus enabling digital

¹ David G. Post, *Against “Against Cyberanarchy”*, 17 BERKELEY TECH. L.J. 1365, 1374 (2002).

² Der Gigi, *Bitcoin is an Idea*, <https://dergigi.com/2021/06/13/bitcoin-is-an-idea/> (last visited Oct. 18, 2021) (“Various digital cash systems have been developed before Bitcoin. All of them failed eventually, and all for similar reasons. The following are particularly interesting in the context of Bitcoin: Ecash by David Chaum (1982); E-gold by Douglas Jackson and Barry Downey (1996); hashcash by Adam Back (1997); bit gold by Nick Szabo (1998); b-money by Wei Dai (1998); RPOW - Reusable Proofs of Work by Hal Finney (2004) ... ‘I hope it’s obvious it was only the centrally controlled nature of those systems that doomed them.’”).

³ See Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, BITCOIN (Nov. 8, 2008), <https://bitcoin.org/bitcoin.pdf> (explaining that digital property required trusted third parties to resolve the double spend problem because “[t]he problem of course is the payee can't verify that one of the owners did not double-spend the coin. A common solution is to introduce a trusted central authority, or mint, that checks every transaction for double spending. After each transaction, the coin must be returned to the mint to issue a new coin, and only coins issued directly from the mint are trusted not to be double spent. The problem with this solution is that the fate of the entire money system depends on the company running the mint, with every transaction having to go through them, just like a bank.”).

⁴ Usman W. Cohan, *The Double Spending Problem and Cryptocurrencies*, CRITICAL BLOCKCHAIN RESEARCH INITIATIVE (Jan. 6, 2021), <https://ssrn.com/abstract=3090174>.

⁵ *Id.*

scarcity, blockchain technology brings the once ethereal and abundant internet closer to our physical, tangible reality. Such paradigm-shifting innovation requires practitioners and policymakers to have thoughtful discussions on how this should change the application of our laws. Specifically, this article will explain how—for the first time since the internet’s conception—copyright law has a “digital first sale,” which is defined below.

The intellectual property right of copyright aims to promote creative expression, which gives rise to public knowledge and learning.⁶ Copyright protection is granted to original works of authorship fixed in a tangible medium of expression, such as novels, movies, and even architectural works.⁷ By securing this right, the modern copyright regime grants copyright owners a bundle of exclusive privileges. Generally, the owner of a copyrighted work may: (1) reproduce copies, (2) prepare derivatives, (3) distribute copies, (4) perform, (5) display, and/or (6) perform publicly by means of digital audio transmission, their copyrighted work.⁸

Notwithstanding the right to distribute, lawful owners of copies of copyrighted works may still control their own copies.⁹ This is the first sale doctrine.

[Without the first sale doctrine], we would have no right to donate our used books or sell our used video games or even give a newly purchased CD to a friend on their birthday. . . It allows copy owners to sell, give away, lend, or rent their copies even when the copyright holder objects.¹⁰

The right of the first sale is necessary because it prevents the “absurd result”¹¹ of not being able to exert any control over one’s personal property. Nevertheless, as society marched on to the internet age, copyright’s first sale doctrine was left behind.

Given the regulatory and judicial interpretation of the first sale

⁶ No state may grant this right, it is purely federal law, 17 U.S.C. § 109(a), arising directly from the mandate contained in the Constitution’s IP clause: “The Congress shall have Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” U.S. CONST. art. I, § 8, cl. 8.

⁷ 17 U.S.C. § 102(a).

⁸ 17 U.S.C. § 106(1)-(6).

⁹ See 17 U.S.C. § 109(a). (However, the original author of these copies still retains the remaining exclusive rights, including the right of reproduction).

¹⁰ AARON PERZANOWSKI & JASON SCHULTZ, *THE END OF OWNERSHIP: PERSONAL PROPERTY IN THE DIGITAL ECONOMY* 25 (2018).

¹¹ *Id.*

doctrine, it was not applied in the digital world merely because digital distributions infringed the reproduction right. Now, blockchain-based non-fungible tokens (NFTs) enable the sale and transfer of copies *without* infringing the reproduction right. Therefore, the first sale doctrine clearly exists when certain digital transfers occur within a blockchain. Without clarification from the Copyright Office, every transfer and sale of NFTs (without prior agreement) has infringed the creator’s copyright, and thus would be deemed invalid transfers. The NFT asset class reached sales in excess of \$40 billion in 2021 alone,¹² so this seemingly minor doctrine may entirely chill an otherwise blossoming market.

Having a digital first sale is also critical from a policy perspective. Over the past four decades, consumers have been slowly losing their personal property rights to digital platforms, a phenomenon deemed “the end of ownership.”¹³ Before the internet, consumers bought physical media like books, cassettes, and VCRs. It would have been unthinkable to consider a record label being able to instantaneously destroy your cassette or being able to control your ability to lend it to others—all of which are standard practice with digital media. Consumers had true ownership because their property rights were all due to first sale protections.

Today, since the right of first sale is non-existent in the digital world, consumers are afforded licenses to works. Consumers usually cannot easily navigate this marketplace since these end-user agreements (EULAs) are obscure, long, and filled with incomprehensible legalese. The average consumer does not read such licenses every time they want to watch a movie or listen to a song, no matter how restrictive the license. Consequently, digital purchases of songs or movies can “be deleted or disabled without warning or explanation for any number of reasons. Perhaps you unknowingly violated some provisions of a site’s terms of service.”¹⁴ For video games as well, Microsoft can stop you from reselling your games “as it currently does for [only] digital games purchased through its Xbox Live service. . .”¹⁵ Similarly, unlike how libraries traditionally operated, where books can be lent whenever, now, eBooks may only be lent a limited amount of times.¹⁶ Since the first sale doctrine does not currently protect digital media, consumers have slowly lost their personal property rights.

¹² Chainalysis Team, *NFT Transaction Activity Stabilizing in 2022 After Explosive Growth in 2021*, CHAINALYSIS (May 5, 2022), <https://blog.chainalysis.com/reports/chainalysis-web3-report-preview-nfts/>.

¹³ See PERSANOWSKI & SCHULTZ, *supra* note 10, at 13.

¹⁴ *Id.* at 6.

¹⁵ *Id.* at 10.

¹⁶ *Id.* at 10-11.

Notwithstanding the argument for the need for a digital first sale, technology has also advanced to a point where it clearly exists through a clear, plain language reading of § 109 applied to NFTs, as this paper demonstrates. However, current legal commentary about NFTs under the first sale doctrine attempts to make technical claims without the requisite technical support, creating analyses with flawed conclusions.¹⁷ This paper provides the necessary technical insight into the first sale analysis to conclusively apply it to blockchain-based digital media. Thus, this paper provides the history of the first sale doctrine in Section II; an explanation of how blockchain technology functions in Section III; the regulatory history of a “digital first sale” in Section IV; and an application of the first sale doctrine to NFTs in Section V.

II. THE RIGHT OF DISTRIBUTION AND THE FIRST SALE DOCTRINE

The first sale doctrine limits a copyright holder’s power to control copies after they are sold or otherwise transferred to a third party. A copy of a work, like a DVD, “so resold or re-transferred may be re-transferred again and again without violating the [copyright holder’s] exclusive distribution right.”¹⁸ This rule is a fundamental principle of copyright law “that, once you’ve sold a copy legally, you can’t restrict its resale.”¹⁹ The first sale or “exhaustion” doctrine is such a core

¹⁷ Phillip Shaverdian, *Blockchain-Based Digital Assets and the Case for Revisiting Copyright’s First Sale Doctrine*, LAW MEETS WORLD (Feb. 19, 2019), <https://www.uclalawreview.org/blockchain-based-digital-assets-and-the-case-for-revisiting-copyrights-first-sale-doctrine-2/> (Concluding that the 1976 Copyright Act must be amended to remove the tangibility requirement); Desiree Moshayedi, *Does the First Sale Doctrine Apply to NFTs?*, CLS BLUE SKY BLOG (Jan. 5, 2022), <https://clsbluesky.law.columbia.edu/2022/01/05/does-the-first-sale-doctrine-apply-to-nfts/> (Concluding that being able to copy/paste an NFT means the first sale doctrine does not apply); Tom Kulik, *Why Blockchain Is No Panacea For The Digital First Sale Doctrine (For Now)*, ABOVE THE LAW (Sep. 25, 2018, 11:48 AM), <https://abovethelaw.com/2018/09/why-blockchain-is-no-panacea-for-the-digital-first-sale-doctrine-for-now/> (Concluding that the owner of a work would violate their own reproduction right by uploading it to a blockchain).

¹⁸ *Capitol Records, LLC v. ReDigi Inc.*, 910 F.3d 649, 655 (2d Cir. 2018); see also *Kirtsaeng v. John Wiley & Sons, Inc.*, 568 U.S. 519, 523 (2013); *Quality King Distrib. v. L’Anza Research Int’l, Inc.*, 523 U.S. 135 (1998); *Bobbs-Merrill Co. v. Straus*, 210 U.S. 339, 351 (1908); see also 4 PATRY ON COPYRIGHT § 13:15 (“Placing a lawful copy of a work in commerce exhausts the distribution and display rights with respect to that particular copy. . .”).

¹⁹ See U.S. COPYRIGHT OFFICE, 87TH CONG., COPYRIGHT LAW REVISION: FURTHER DISCUSSIONS AND COMMENTS ON PRELIMINARY DRAFT FOR REVISED U.S. COPYRIGHT LAW 212 (1964).

principle that it also arises in American trademark²⁰ and patent²¹ laws.

Indeed, the first sale doctrine has “an impeccable historic pedigree,” tracing its lineage back to the “common law’s refusal to permit restraints on the alienation of [personal property].”²² Courts have concluded that “if an owner restricts the resale or use of an article after selling it, that restriction ‘is void, because . . . it is against Trade and Traffique, and bargaining and contracting between man and man.’”²³ Such restrictions on alienation have even been seen as “hateful to the law from Lord Coke’s day to ours” and “obnoxious to the public interest.”²⁴ This distaste for restrictions on alienation arises due to the economic “inconvenience and annoyance to the public that . . . are too obvious to require illustration.”²⁵

One such obvious inconvenience is the impact restraints would have on healthy market competition. The right of first sale embodies the “importance of leaving buyers of goods free to compete with each other when reselling or otherwise disposing of those goods.”²⁶ Such competition, including the freedom to resell, works to the advantage of the consumer.²⁷ Indeed, “Congress enacted a copyright law that (through the ‘first sale’ doctrine) limits copyright holders’ ability to divide domestic markets. And that limitation is consistent with antitrust laws that ordinarily forbid market divisions.”²⁸

²⁰ See, e.g., *Beltronics USA, Inc. v. Midwest Inventory Distrib., LLC*, 562 F.3d 1067 (10th Cir. 2009).

²¹ See, e.g., *Impression Prod., Inc. v. Lexmark Int’l, Inc.*, 137 S. Ct. 1523 (2017).

²² *Kirtsaeng*, 568 U.S. at 538.

²³ 1 E. COKE, *INSTITUTES OF THE LAWS OF ENGLAND* § 360, p. 223 (1628); see JOHN C. GRAY, *RESTRAINTS ON THE ALIENATION OF PROPERTY* § 27, p. 18 (2d ed. 1895) (“A condition or conditional limitation on alienation attached to a transfer of the entire interest in personalty is as void as if attached to a fee simple in land.”).

²⁴ *Straus v. Victor Talking Mach. Co.*, 243 U.S. 490, 501 (1917).

²⁵ *Keeler v. Standard Folding Bed Co.*, 157 U.S. 659, 667 (1895).

²⁶ *Kirtsaeng*, 568 U.S. at 539.

²⁷ See, e.g., *Leegin Creative Leather Prods., Inc. v. PSKS, Inc.*, 551 U.S. 877, 885-86 (2007) (restraints with “manifestly anticompetitive effects” are per se illegal; others are subject to the rule); 1 PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW* ¶ 100, at 4 (3d ed. 2006) (“[T]he principal objective of antitrust policy is to maximize consumer welfare by encouraging firms to behave competitively.”).

²⁸ *Kirtsaeng*, 568 U.S. at 552-53.

A. History of the first sale doctrine in U.S. copyright law

In the 1908 Supreme Court case, *Bobbs-Merrill Co v. Straus*, the first sale doctrine was specifically embraced as it applies to copyright law. In this case, Straus attempted to implement price controls on any resales of his books.²⁹ The copyright statute at the time provided copyright owners “the sole liberty of printing, reprinting, publishing, completing, copying, executing, finishing, and vending” copies of their works.³⁰ At issue was whether the right to “vend” included having control on future resales. The court reasoned that granting control over all future resales would extend our copyright statute “beyond its meaning [and] . . . legislative intent in its enactment.” Thus, without contractual duties with each subsequent purchaser of a book, authors do not have the continued right to maintain exclusive control over secondary sales.

B. Codification of the first sale doctrine

In 1909, one year after the *Bobbs-Merrill* decision, “Congress [explicitly] codified the first sale doctrine in § 41 of the Copyright Act of 1909”³¹ to make it “clear that [Congress had] no intention [of] enlarg[ing] in any way the construction to be given to the word ‘vend.’”³² It was not meant to allow control of future sales, which would undermine free trade and healthy market competition. The current Copyright Act of 1976 codified the first sale doctrine in § 109(a) and replaced “vend” with “distribute,”³³ “to avoid the ‘redundan[cy]’ present in pre-1976 law.”³⁴ The current § 109(a) states that notwithstanding the right to distribute, “the owner of a particular copy or phonorecord lawfully made . . . is entitled, without the authority of the copyright owner, to sell or otherwise dispose of the possession of that copy or phonorecord.” This explicit language of § 109(a) “serve[s] as a statutory bulwark against courts deviating from *Bobbs-Merrill* in a way that increases copyright owners’ control over downstream distribution.”³⁵

²⁹ *Bobbs-Merrill Co. v. Straus*, 210 U.S. 339, 340 (1908).

³⁰ *Id.* at 348.

³¹ *Kirtsaeng*, 568 U.S. at 582 (Ginsburg, J., dissenting).

³² *Id.*

³³ U.S. COPYRIGHT OFFICE, 87TH CONG., COPYRIGHT LAW REVISION: REPORT OF THE REGISTER OF COPYRIGHTS ON THE GENERAL REVISION OF U.S. COPYRIGHT LAW 21 (1961) (noting that the exclusive rights to “publish” and “vend” works under the Copyright Act of 1947, § 1(a), 61 Stat. 652–653, were “redundant”).

³⁴ *Kirtsaeng*, 568 U.S. at 581 (Ginsburg, J., dissenting).

³⁵ *Id.* at 582.

C. No “digital first sale”

Despite this incredibly robust common law history, clear legislative intent, and even explicit statutory language, sales of digital files have consistently been stripped of first sale protections.³⁶ Policymakers have concluded that since digital transmissions required reproducing a copy of a file (the work), digital transmissions infringed on the exclusive right of reproduction. A digital distribution of a reproduced copy was thus *unlawfully* made, and beyond the scope of the first sale doctrine.³⁷

However, blockchain technology now enables such digital distributions that categorically avoid making a copy of, or “reproducing” the digital file.³⁸ Such core functionality of avoiding the double-spend dilemma, is in fact, the *raison d’être* of blockchain technology.³⁹

III. BLOCKCHAIN TECHNOLOGY

This article will now explore the core architecture of blockchain technology, including relevant nuances. However, due to the complexity of blockchain technology, this article will make some generalizations about the technology. More technical details are placed within the footnotes. Readers with a strong understanding of blockchains and NFTs may skip to Section IV on page 15.

A. Blockchain basics

The first globalized blockchain and accompanying cryptocurrency was described in the Bitcoin whitepaper in 2008.⁴⁰ Bitcoin’s anonymous creator(s) combined 40 years’ worth of cryptographic research in a novel way to create the world’s first decentralized and internet-native digital currency.⁴¹ At their core, blockchains enable the creation of scarce digital assets by solving the double-spend problem—one may not copy/paste digital assets on a blockchain *ad infinitum*.⁴²

³⁶ See *infra* section IV.

³⁷ *Kirtsaeng*, 568 U.S. at 524.

³⁸ See *infra* section III.

³⁹ See Cohan, *supra* note 4.

⁴⁰ See generally Nakamoto, *supra* note 3.

⁴¹ David Andreessen, *Why Bitcoin Matters*, N.Y. TIMES (Jan. 21, 2014, 11:54 AM), <https://archive.nytimes.com/dealbook.nytimes.com/2014/01/21/why-bitcoin-matters/>; See generally Whitfield Diffie & Martin E. Hellman, *New Directions in Cryptography*, IT-22 IEEE TRANSACTIONS ON INFO. THEORY 644, 645 (1976); R.L. Rivest, A. Shamir, & L. Adleman, *A Method for Obtaining Digital Signatures and Public-Key Cryptosystems*, 21 COMM’NS OF THE ACM 120 (1978).

⁴² Cohan, *supra* note 4.

As a data type, blockchains maintain separate blocks of data (e.g., transactions), that are chronologically linked to each other, forming a digital chain of blocks.⁴³ This chain, consisting of the “ledger,” is the complete, global economic history of ownership on the blockchain.⁴⁴ While technologists may debate the precise nature and definition of a blockchain, for the purposes of this article, blockchains are best understood as being: (1) physical networks that maintain virtual computers,⁴⁵ computing economic functions,⁴⁶ that (2) maintain a distributed ledger⁴⁷ in an append-only⁴⁸ manner, and (3) secured

⁴³ Nakamoto, *supra* note 3.

⁴⁴ Marco Iansiti & Karim R. Lakhani, *The Truth About Blockchain*, HARV. BUS. REV. (Jan. 2017), <https://hbr.org/2017/01/the-truth-about-blockchain>.

⁴⁵ See *infra* notes 52-56 and accompanying text.

⁴⁶ ANDREAS M. ANTONOPOULOS & GAVIN WOOD, *MASTERING ETHEREUM: BUILDING SMART CONTRACTS AND DAPPS* ch. 1 (2018).

⁴⁷ Blockchains maintain a single, shared ledger of all economic activity. A ledger is a record of accounts and transactions. Ledger, BLACK’S LAW DICTIONARY (11th ed. 2019) (“A book or series of books used for recording financial transactions in the form of debits and credits; esp., a book in which a business or bank records how much money it receives and spends. — Also termed general ledger.”). In its simplest form, ledgers can be used to record transactions as a credit from one account and an equal debit to another account. This method of accounting (i.e., double-entry bookkeeping) is the foundation of modern capitalism. See MAX WEBER, *GENERAL ECONOMIC HISTORY* 208 (Frank H. Knight Trans., First Collier Books ed., 1961) (“[T]he most general presupposition for the existence of . . . present-day capitalism is that of rational capital accounting . . .”). Blockchain is a form of Distributed Ledger Technology (DLT). Harish Natarajan et al., *Distributed Ledger Technology (DLT) and Blockchain*, WORLD BANK GROUP VII (2017), <https://documents1.worldbank.org/curated/en/177911513714062215/pdf/122140-WP-PUBLIC-Distributed-Ledger-Technology-and-Blockchain-Fintech-Notes.pdf> (“A ‘blockchain’ is a particular type of data structure used in some distributed ledgers which stores and transmits data in packages called ‘blocks’ that are connected to each other in a digital ‘chain’. Blockchains employ cryptographic and algorithmic methods to record and synchronize data across a network in an immutable manner.”). Instead of one centralized server and ledger, DLT takes one ledger and duplicates it across different computers (nodes), *Id.* at 2 (“A shared ledger can be a . . . distributed ledger which consists of multiple ledgers maintained by a distributed network of nodes . . .”) with a validation and consensus scheme explained below. *Id.* at 1-2. All changes to the ledger are publicly available and processed simultaneously and in parallel on every node. In other words, every transaction is redundantly computed by every single node, thus ensuring accuracy. This architecture of redundancy and cryptographically-based validation is a hallmark of modern cybersecurity. Bev Littlewood and Lorenzo Strigini, *Redundancy and Diversity in Security*, in *COMPUTER SECURITY – ESORICS 2004* 423, 423 (2004) (“Redundancy as a general approach is clearly understood to be a valid defense against physical faults. There is a rich set of understood design “tricks” that use redundancy against various forms of faults and failures, and knowledge about how to optimize them for different purposes . . .”).

⁴⁸ *Blockchain & Distributed Ledger Technology (DLT)*, WORLD BANK, <https://www.worldbank.org/en/topic/financialsector/brief/blockchain-dlt>

through various cryptographic consensus mechanisms.⁴⁹

B. Blockchains as virtual computers

One pervasive misconception that misinforms law⁵⁰ and legal commentary⁵¹ is the belief that blockchains are mere ephemeral,

(Apr. 12, 2018).

⁴⁹ To process new blockchain transactions and other economic activity (i.e., add new blocks), blockchain networks levy cryptographic and algorithmic methods to maintain consensus on the correct and updated state of their ledger by making it prohibitively expensive to add fraudulent blocks. To add such fraudulent blocks, one must control more than half of the network (i.e., a 51% attack). Muhammad Saad et al., *Exploring the Attack Surface of Blockchain: A Comprehensive Survey*, 22 IEEE COMM'NS SURVS. AND TUTORIALS 1977, 1981 (2020) (“Conceptually, Blockchain can be viewed as a repository of data that is tamper-evident due to its replication over all nodes in a peer-to-peer system. Transactions represent the events that drive the Blockchain application. Blockchain applications use various consensus algorithms for trust among peers over the state of the ledger. Moreover, the consensus algorithms ensure a consistent and transparent view of the Blockchain, thereby resolving conflicts and forks. This is, no block is added to the Blockchain, until it fulfills the conditions outlined by the consensus algorithm. Moreover, each algorithm has unique functional and operational properties that drive the consensus over the Blockchain.”). Two major consensus mechanisms are Proof of Work (PoW) and Proof of Stake (PoS), PoW secures a blockchain by requiring “miners” (i.e., nodes that validate transactions and blocks) to use immense computing power and electricity to validate transactions and new blocks. *Id.* But see Jon Truby et al., *Blockchain, Climate Damage, and Death: Policy Interventions to Reduce the Carbon Emissions, Mortality, and Net-Zero Implications of Non-Fungible Tokens and Bitcoin*, 88 ENERGY RSCH. & SOC. SCI. 1, 11 (2022) (discussing the perverse climate consequences of the use of NFTs in energy-intensive PoW mining). The more computing power a miner has, the higher the likelihood of mining a new block, which rewards that miner with cryptocurrency. If someone wanted to take over the network to add faulty transactions, they would have to control more than half of the entirety of the computing power of the network, which is economically unfeasible with large and mature blockchains. Saad, *supra* note 49, at 1982. Conversely, PoS secures a blockchain by requiring “validators” (i.e., nodes that validate transactions and blocks) to “stake” (i.e., lock up) a portion of their tokens to validate transactions and new blocks. *Id.* The higher the amount staked, the higher the likelihood of validating a new block, which rewards that validator with cryptocurrency. With some PoS schemes, if an entity unsuccessfully attempted to push a faulty transaction or block, they would lose their staked cryptocurrency which raises the costs of an attack. *Id.* Like PoW, in PoS, someone would have to control more than half of a blockchain’s staked value to successfully take over the network which is prohibitively expensive with large and mature blockchains. *Id.*

⁵⁰ Indeed, this misconception of the database has already penetrated governments and their statutes, defining blockchain as: “the use of a digital database containing records of financial transactions, which can be simultaneously used and shared within a decentralized, publicly accessible network and can record transactions between two parties in a verifiable and permanent way.” UTAH CODE ANN. § 13-55-102(3) (West 2021) (repealed 2022).

⁵¹ See Shaverdian, *supra* note 17 (concluding that the 1976 Copyright Act must

intangible “decentralized databases.” However, that definition is reductive and leads to confusion. Most blockchains, whether complex Turing-complete⁵² blockchains (that enable general-purpose computations), or even non-Turing complete blockchains (with limited computations),⁵³ are best defined as a distributed network of computers⁵⁴ maintaining a virtual machine⁵⁵—not mere databases—because they support the execution of computations, whether the computations are general-purpose or limited.⁵⁶

These computations on Ethereum, for example, can perform any arbitrary function, termed a “smart contract.”⁵⁷ Unlike a legal contract, a smart contract is merely computer code that interacts with a blockchain, it needs not entail legal, contractual duties. This broad functionality enables the existence of programs that provide complex financial services.⁵⁸ Similarly, on the Bitcoin blockchain, computations (although more limited than Ethereum) are executed via a special “script.”⁵⁹ The most common script is one to “redeem” a previous

be amended to remove the tangibility requirement.).

⁵² DYLAN YAGA ET AL., NAT’L INST. OF STANDARDS & TECH., U.S. DEP’S OF COMMERCE, NISTIR 8202, BLOCKCHAIN TECHNOLOGY OVERVIEW 54 (2018).

⁵³ ANTONOPOULOS & WOOD, *supra* note 46, at ch. 1.

⁵⁴ See *Consensus Mechanisms*, ETHEREUM, <https://ethereum.org/en/developers/docs/consensus-mechanisms/> (Sept. 29, 2022).

⁵⁵ ANTONOPOULOS & WOOD, *supra* note 46, at ch. 1; see also *Consensus Mechanisms*, *supra* note 54.

⁵⁶ A blockchain is best defined as one distributed computer/machine even though it is made up of many nodes because each node nonetheless must have identical data as the other nodes and compute the same data at the same time. On the Ethereum blockchain, for example, a transaction’s lifespan consist of the following: (1) transaction is authorized (signed) by the sender, (2) transaction is propagated to all nodes on the blockchain, (3) transaction is added to a mining node’s candidate block of several transactions, (4) a proof of work is found to make that candidate block valid, and (5) every other node verifies and accepts that new block (including that transaction). ANTONOPOULOS & WOOD, *supra* note 46, at ch. 6.

⁵⁷ *Id.*

⁵⁸ These functions are computed by each node on the blockchain network via the Ethereum Virtual Machine (EVM). *Id.* Indeed, the Ethereum protocol “exists solely for the purpose of keeping the continuous, uninterrupted, and immutable operation of this special state machine [EVM]; It’s the [singular] environment in which all Ethereum accounts and smart contracts live. At any given block in the chain, Ethereum has one and only one ‘canonical’ state . . .” *Ethereum Virtual Machine (EVM)*, ETHEREUM <https://ethereum.org/en/developers/docs/evm/> (Nov. 4, 2022).

⁵⁹ ARVIND NARAYANAN ET. AL., BITCOIN AND CRYPTOCURRENCY TECHNOLOGIES 55 (Princeton Univ. Press 2016).

transaction output; in other words, to send bitcoin.⁶⁰

Although this may seem like mere semantics to show how a blockchain is more than a mere intangible database (rather, it runs on a physical network), it nevertheless bears directly on our analysis of how blockchain-based digital transmissions uniquely fall within the first sale doctrine, explained in Section V.

C. Nonfungible tokens

Nonfungible tokens (NFTs) are particularly important. Recall that smart contracts are programs that are executed by blockchains to perform any number of different economic functions. Smart contracts can take the form of NFTs, which are unique digital assets. Instead of fungible cryptocurrencies, where each individual unit of a cryptocurrency is identical, each NFT is per se distinguishable from all other NFTs.⁶¹ Such functionality enables tokenizing unique nonfungible assets like art and music, thereby allowing the purchase and sale of digital goods on blockchains.⁶²

An NFT acts as a record of ownership of an item, like a certificate of authenticity of a picture of a cat. The file of the picture itself is not always stored on the blockchain, but it can be.⁶³ On the Ethereum blockchain, all NFTs must conform to the ERC721 smart contract standard.⁶⁴ This industry-adopted standard is relatively simple: it specifies which specific address holds which specific NFT, which is nothing more than a unique identifier in a given NFT smart contract.⁶⁵ With that said, the only unique aspect of an NFT is that each NFT minted from a given ERC721-compliant smart contract will have a different identifier (e.g. “3”)—uniqueness is *not* derived from the actual asset that the NFT represents (like the image of a cat).⁶⁶

Instead, what an NFT really “looks like,” or the digital asset

⁶⁰ However, other scripts are available that enable functionality like escrowing transactions or creating timed micropayments. Although Bitcoin’s scripting language is more limited than Ethereum’s, Bitcoin’s blockchain is nevertheless still a virtual computer based on computations (scripts), which in turn affect the state of its ledger. *Id.*

⁶¹ William Entriken et al., *EIP-721: Non-Fungible Token Standard*, ETHEREUM IMPROVEMENT PROPOSALS (Jan. 24, 2018), <https://eips.ethereum.org/EIPS/eip-721>.

⁶² *Id.*

⁶³ Joshua Durham, Blog Post, *The Growing Popularity of NFTs: How to Protect Your NFT Personal Property Rights*, WAKE FOREST J. OF BUS. & INTELL. PROP. L. (Feb. 21, 2022) <https://jbipl.pubpub.org/pub/xptfofeo/release/2>.

⁶⁴ Entriken, *supra* note 61.

⁶⁵ Durham, *supra* note 63.

⁶⁶ *Id.*

referenced by an NFT, is determined by its metadata.⁶⁷ This metadata may be “on-chain” or “off-chain.”⁶⁸ On-chain metadata immutably lives on its NFT’s smart contract, which is on a blockchain.⁶⁹ This art, the file, is stored entirely on the Ethereum blockchain, but deploying such NFTs can be expensive.⁷⁰ Due to such cost, the ERC721 standard includes a method, “tokenURI,” which allows developers to simply tell NFTs where to locate their metadata,⁷¹ and developers can then host that data somewhere off-chain, like on a website.⁷² Typically, NFTs do indeed point off-chain⁷³ to either an HTTP URL metadata file or a hash on IPFS⁷⁴ (a data storage protocol). These solutions require constant hosting on servers, most likely by NFT creators.

Since NFTs act as deeds to digital assets, NFTs of copyrightable subject matter like art and music may be bought and sold entirely on a blockchain. The art’s “file”, or metadata, may also exist on the blockchain or be hosted elsewhere. However, a seller of an NFT may not retain a “copy” of the NFT, instead, a transfer of an NFT can transfer all access, control, and other ownership rights to that specific NFT on the blockchain—no NFT can be double-spent as a basic function of existing on a blockchain.⁷⁵ Such novel digital scarcity has given rise to high-profile art NFTs, including those by the artist Beeple,⁷⁶ who sold his NFT for a record-breaking \$69 million, and CryptoPunks⁷⁷ and The

⁶⁷ *Id.*

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ Durham, *supra* note 63; *see also* Entriken, *supra* note 61.

⁷² *See* moreReese, *How Are NFTs Stored? On-Chain, Off-Chain and Decentralized Storage*, PUBDAO (Aug. 25, 2022), <https://decrypt.co/resources/how-are-nfts-stored-on-chain-off-chain-and-decentralized-storage>; Durham, *supra* note 63; Entriken, *supra* note 61.

⁷³ Devin Finzer, *The Non-Fungible Token Bible: Everything You Need to Know About NFTs*, OPENSEA BLOG (Jan. 10, 2020), https://opensea.io/blog/guides/non-fungible-tokens/#Non-fungible_token_metadata.

⁷⁴ @jonty, TWITTER (Mar. 17, 2021, 8:37 AM), <https://twitter.com/jonty/status/1372165292751732740>.

⁷⁵ Of course, a smart contract may be written in such a way where this statement is not entirely accurate, or that allows a third party to also access and have control over the NFT. There are also other smart contract standards like ERC1155 which creates semi-fungible tokens, but those tokens are outside the scope of this paper. *See* Nathan Reiff, *How Does a Block Chain Prevent Double-Spending of Bitcoins?* INVESTOPEDIA, <https://www.investopedia.com/ask/answers/061915/how-does-block-chain-prevent-doublespending-bitcoins.asp> (Aug. 26, 2021).

⁷⁶ *NFT sales aim for a \$17.7B record in 2021: Report by Cointelegraph Research*, COINTELEGRAPH (Nov. 30, 2021), <https://cointelegraph.com/news/nft-sales-aim-for-a-17-7b-record-in-2021-report-by-cointelegraph-research>.

⁷⁷ CryptoPunks, LARVA LABS, <https://www.larvalabs.com/cryptopunks> (last visited May 10, 2022).

Bored Ape Yacht Club,⁷⁸ which are NFT collections commonly used as profile pictures and confer other utilitarian benefits.⁷⁹

IV. A DIGITAL FIRST SALE DOCTRINE

Recall that the first sale doctrine bars restrictions on the alienation of copies of works, such as transfers and resales. However, under current regulatory treatment and caselaw, the first sale doctrine does not yet apply to any digital media.⁸⁰ This is nevertheless a historical oddity since the first sale doctrine was consistently embraced by copyright law for over one hundred years in the United States. Its inapplicability to digital media is a mere legal exception driven by technological limitations and may very well be an unnecessary appendage given that blockchain technology resolves the critical issues that a digital first sale once posed. Five key times over the past two decades, decision-makers have addressed the issue of whether there should be a “digital first sale,” each of which are summarized below.

A. Plain language statutory interpretation of § 109 barred a digital first sale

Decision-makers first explored a digital first sale in 1995 with the presidential Information Infrastructure Task Force.⁸¹ The task force concluded that since digital transmissions infringed the reproduction right, they were outside the scope of the first sale doctrine.

. . . the first sale doctrine limits only the copyright owner’s distribution right; it in no way affects the reproduction right. Thus, the first sale doctrine does not allow the transmission of a copy of a work (through a computer network, for instance), because, *under current technology* the transmitter retains the original copy of the work while the recipient of the transmission obtains a reproduction of the original copy (i.e., a new copy), rather than the copy owned by the transmitter.⁸²

⁷⁸ BORED APE YACHT CLUB <https://boredapeyachtclub.com/#/> (last visited May 10, 2022).

⁷⁹ Scott Meiklejohn, *The Art of Using NFT Memberships*, RECHARGE (Aug. 22, 2022), <https://rechargepayments.com/blog/nfts-and-access-memberships/>.

⁸⁰ INFO. INFRASTRUCTURE TASK FORCE, INTELLECTUAL PROPERTY AND THE NATIONAL INFORMATION INFRASTRUCTURE: THE REPORT OF THE WORKING GROUP ON INTELLECTUAL PROPERTY RIGHTS 92 (Sep. 1995).

⁸¹ *See generally id.*

⁸² *Id.* at 92 (emphasis added).

The dilemma caused by digital transmissions was that files were necessarily reproduced, thus infringing on the copyright holder's exclusive right to reproduction. Consequently, the first sale doctrine could not apply because it only allows "the owner of a particular, *lawfully-made* copy" of a work to dispose of it.⁸³

The task force, however, clarified that if technology "allows the transmission of a copy without making an unlawful reproduction – i.e., no copy remains with the original owner – the first sale doctrine *would apply* and the transmission would not be an infringement."⁸⁴ In other words, if a file was not "double-spent," then it would be protected under § 109. This conclusion is perfectly logical since transmitting a file without reproducing a copy (or infringing any other right) is a lawfully made transmission.

B. The risks of a digital first sale were deemed too severe

Three years later, in 1998, Congress again considered a digital first sale when it enacted the Digital Millennium Copyright Act (DMCA).⁸⁵ Congress ordered the Register of Copyrights to report on "the relationship between existing and emergent technology and the operation" of § 109.⁸⁶ Unlike the pure statutory interpretation of the 1995 presidential task force, the final 2001 report from the Copyright office explored the perverse market consequences of allowing a digital first sale at that time.⁸⁷ It recommended not amending § 109.

Copyright piracy in the online world is not a matter of speculation—it is, unfortunately, an established fact of life. It appears likely that expanding section 109 would encourage infringement of the reproduction right, either in the mistaken belief that the provision allows a user to retain a copy of a work after it has been transmitted one or more times, or in the belief that the defense can be asserted in bad faith to defeat, or at least complicate, an infringement lawsuit.⁸⁸

This report was released right at the height of Napster's plight in the

⁸³ *Id.* at 95 (emphasis added).

⁸⁴ *Id.* at 93 (emphasis added).

⁸⁵ Digital Millennium Copyright Act, ch. 12, 112 Stat. 2860, 2876 (1998).

⁸⁶ *Id.*

⁸⁷ U.S. COPYRIGHT OFFICE, REGISTER OF COPYRIGHTS, A REPORT OF THE REGISTER OF COPYRIGHTS PURSUANT TO §104 OF THE DIGITAL MILLENNIUM COPYRIGHT ACT, at v (2001).

⁸⁸ *Id.* at 99.

music industry, which was emphasized in the report.⁸⁹ The Copyright Office could not reasonably allow a digital first sale because it would have required “either a voluntary deletion of the sender’s copy or its automatic deletion by technological means. Both [of which were] unworkable at [that] time.”⁹⁰

Internet technology at that time lacked the sophistication to prevent a digital transmission from simultaneously creating an unauthorized reproduction such that a file was double spent. Ultimately, the Copyright Office concluded that the marketplace should have the opportunity to adapt licensing practices to further the goals of the first sale doctrine “before Congress alters the balance of rights and exceptions in the Copyright Act.”⁹¹

C. A growing harm to consumers from restraints on alienation became apparent

Three years later, however, a 2004 CBO report presciently forewarned that such licensing practices cause consumers “frustration with legal constraints on their ability to transfer copyrighted material in digital form . . . As a consequence, additional legislative or judicial scrutiny may be required.”⁹² It was becoming more apparent that restrictive downstream licensing would invariably cause the exact frustrations that the first sale doctrine is meant to ameliorate.

In 2013, twelve years after the Copyright Office’s 2001 report, the Department of Commerce’s Internet Policy Taskforce issued a report that again addressed a digital first sale.⁹³ It relied on the conclusion of the previous reports, that the “first sale doctrine does not apply . . .

⁸⁹ See *A&M Records, Inc. v. Napster, Inc.*, 239 F.3d 1004 (9th Cir. 2001) (discussing “Napster’s deleterious effect on the present and future digital download market. . . Having digital downloads available for free on the Napster system necessarily harms the copyright holders’ attempts to charge for the same downloads.”).

⁹⁰ U.S. COPYRIGHT OFF., *supra* note 87, at 97.

⁹¹ *Id.* at 101; Instead of furthering first sale protections, the industry consisting of iTunes, Pandora, and Spotify adopted licensing models that merely grant access (via streaming) to content, instead of allowing the exclusive alienability of content. See Jacob Ganz, *How Streaming is Changing Music*, NPR (June 1, 2015, 10:20 AM), <https://www.npr.org/sections/therecord/2015/06/01/411119372/how-streaming-is-changing-music>.

⁹² CONG. BUDGET OFF., COPYRIGHT ISSUES IN DIGITAL MEDIA 17 (2004), <https://www.cbo.gov/sites/default/files/108th-congress-2003-2004/reports/08-09-copyright.pdf>.

⁹³ *Commerce’s Internet Policy Task Force Releases Report on Digital Copyright Policy*, COMMERCE.GOV (Jul. 31, 2013, 12:34 PM), <https://2010-2014.commerce.gov/blog/2013/07/31/commerces-internet-policy-task-force-releases-report-digital-copyright-policy.html>.

where copies are created implicating the reproduction right.”⁹⁴ It also reiterated the perverse market effects of wide-spread infringement noted in the 2001 report.⁹⁵ The 2013 report, however, conceded that if the structure of digital sales continues to be predominately through licenses (as it still is today), then “the result could be to render the first sale doctrine meaningless for that type of work. Such concerns may lead courts or policymakers to reinterpret what constitutes a ‘license’ or to expand the scope of the first sale doctrine.”⁹⁶

The 2013 report ultimately warned of the growing concerns on restraints of alienation due to licensing that were raised a decade prior in the CBO report. It realized that technology had changed since the 2001 report as the world had been increasingly digitized, thus the first sale doctrine may become “obsolete.”⁹⁷ It raised questions as to:

. . . whether there is a way to preserve the doctrine’s benefits, allowing the equivalent of sharing favorite books with friends, or enabling the availability of less-than-full-price versions to impecunious students. Will the market provide these opportunities, and if so, how? And are there any changes in technological capabilities that would alter any of the Copyright Office’s 2001 conclusions?⁹⁸

Two years later, in 2015, the Copyright Office issued a Notice and Request for Public Comment that briefly addressed a digital first sale.⁹⁹ It noted the increased concern of “unilateral contractual provisions . . . [such that] at some point in the future a case could be made for statutory change.”¹⁰⁰ Although consumer protection from restrictive licensing was increasingly desired, and the first sale doctrine was at risk of obsolescence, the Copyright Office continued to sit on the issue.

⁹⁴ INTERNET POL’Y TASK FORCE, U.S. DEP’T OF COM., COPYRIGHT POLICY, CREATIVITY, AND INNOVATION IN THE DIGITAL ECONOMY 35 (2013), <https://www.uspto.gov/sites/default/files/news/publications/copyrightgreenpaper.pdf>.

⁹⁵ *Id.* at 35-36.

⁹⁶ *Id.* at 36.

⁹⁷ *Id.* at 37.

⁹⁸ *Id.*

⁹⁹ Software-Enabled Consumer Products Study: Notice and Request for Public Comment, 80 Fed. Reg. 77668, 77670 (Dec. 15, 2015).

¹⁰⁰ *Id.*

D. The potential harm to copyright holders outweighed the harm to consumers

One year later, in 2016, the Department of Commerce’s Internet Policy Taskforce issued another robust report addressing a digital first sale.¹⁰¹ In a moment of euphemistic concession, it concluded that although the first sale doctrine does not yet apply to digital transmissions “it is difficult to measure the value of this loss.”¹⁰² This “unmeasurable” loss was weighed against the perceived risks of a digital first sale. Notwithstanding the 2013 report’s conclusions to the contrary, regarding restrictive licensing, this 2016 report concluded that since the risks of infringement described in the 2001 report remain intact, the “expansion” of the first sale doctrine “could curtail at least some of the flexibilities of new [licensing] business models.”¹⁰³

The Task Force concluded that amending the law was not advisable because there was little change since the 2001 report.¹⁰⁴ Specifically, it noted that: (1) there are “some [licensing] benefits that parallel those provided by the first sale doctrine;” (2) the loss of “the inability to resell copies or establish a secondary market” is difficult to evaluate; (3) “perfect [digital] copies” that could be “transmitted nearly instantaneously anywhere” would compete with new physical copies; and (4) “the potential multiplication of copies” has not been ameliorated by technology.¹⁰⁵ The report again returned to the idea of technological advancements that could prevent double-spending of copies. If such technology were developed, “it may affect [the] analysis”¹⁰⁶

E. Leading caselaw embraced the plain language reading of § 109 as excluding digital transmissions

The leading case on a “digital first sale” also agreed with every report on the subject: digital transmissions were not protected by the first sale doctrine since they infringed the reproduction right. In *Capitol Records LLC v. ReDigi Inc.*, ReDigi operated a website that allowed the resale of music through “forward and delete” technology where digital music files were deleted from the sender’s computer once sold.¹⁰⁷

¹⁰¹ INTERNET POL’Y TASK FORCE, U.S. DEP’T OF COM., WHITE PAPER ON REMIXES, FIRST SALE, AND STATUTORY DAMAGES (Jan. 2016), https://www.ntia.doc.gov/files/ntia/publications/white_paper_remixes-first_sale-statutory_damages_jan_2016.pdf.

¹⁰² *Id.* at 58.

¹⁰³ *Id.*

¹⁰⁴ *Id.* at 67.

¹⁰⁵ *Id.*

¹⁰⁶ *Id.* at 66.

¹⁰⁷ *Capitol Recs., LLC v. ReDigi Inc.*, 910 F.3d 649, 652-53 (2d Cir. 2018).

However, the court found that “[i]n the course of transferring a digital music file from an original purchaser’s computer . . . the digital file is first received and stored on ReDigi’s server and then, at the new purchaser’s option, may also be subsequently received and stored on the new purchaser’s device.”¹⁰⁸ The court reasoned that

[a]t each of these steps, the digital file is fixed in a new material object “for a period of more than transitory duration.” The fixing of the digital file in ReDigi’s server, as well as in the new purchaser’s device, creates a new phonorecord, which is a reproduction. . . . [T]he resale of digital files thus inevitably involves the creation of new phonorecords by reproduction, even if the standalone digital file is deemed to be a phonorecord.¹⁰⁹

The court corroborated its reasoning with the previous reports, stating that “‘a digital file transfer creates a new copy or phonorecord on the transferee’s computer’ and thus does not qualify for first sale protection.”¹¹⁰

¹⁰⁸ *Id.* at 657.

¹⁰⁹ *Id.* (quoting *Cartoon Network LP, LLLP v. CSC Holdings, Inc.*, 536 F.3d 121, 127 (2d Cir. 2008)).

¹¹⁰ *Id.* at 660.

V. BLOCKCHAIN-BASED DIGITAL ASSETS AND THE FIRST SALE DOCTRINE

After the original 1995 Copyright Office report, every similar report based its conclusion on the dispositive fact that digital transmissions violated the reproduction right.¹¹¹

The application of section 109 to digital content is not a question of whether the provision applies to works in digital form — it does. . . . The question [] is whether the conduct of transmitting the work digitally, so that another person receives a copy of the work, falls within the scope of the defense.¹¹²

Indeed, the logical corollary to this conclusion is that if a digital transmission did not reproduce a copy of a work, then it could be afforded § 109 protection.¹¹³ In *ReDigi* as well, reproduction of copies was the one “crucial fact.”¹¹⁴ This legal conclusion was so compelling, and was the core premise on which all of the reports relied, because it is derived from a plain language, textualist reading of § 109.

The dilemma of a digital first sale had always been technological, not legal: “*under current technology* the transmitter retains the original copy of the work while the recipient of the transmission obtains a reproduction of the original copy.”¹¹⁵ As applied to blockchain and NFTs, this same plain language reading now leads one to a very clear

¹¹¹ U.S. COPYRIGHT OFF., *supra* note 87, at 80 (“Section 109 provides no defense to infringements of the reproduction right. Therefore, when the owner of a lawful copy of a copyrighted work digitally transmits that work in a way that exercises the reproduction right without authorization, section 109 does not provide a defense to infringement. . . . The Supreme Court drew a sharp distinction between the two rights, creating an exception to the vending (i.e., distribution) right only to the extent that it didn’t interfere with the reproduction right. We therefore conclude that section 109 does not apply to digital transmission of works.”); INTERNET POL’Y TASK FORCE, U.S. DEP’T OF COM., *supra* note 94, at 35 (“This doctrine, which originated to ensure a consumer’s control over her tangible physical property, enables the existence of libraries and second-hand markets in records and books. But the copyright owner’s remaining exclusive rights, notably the right of reproduction, are not affected. As a result, the first sale doctrine does not apply to the distribution of a work through digital transmission where copies are created implicating the reproduction right.”); INTERNET POL’Y TASK FORCE, U.S. DEP’T OF COM., *supra* note 101, at 35 (“[T]he first sale doctrine does not permit the distribution of a work through digital transmission where copies are created, because the reproduction right is implicated.”).

¹¹² U.S. COPYRIGHT OFF., *supra* note 87, at 78-79.

¹¹³ *See id.* at 79-80.

¹¹⁴ *ReDigi Inc.*, 910 F.3d at 657.

¹¹⁵ INFO. INFRASTRUCTURE TASK FORCE, *supra* note 80, at 92 (emphasis added).

application of the first sale doctrine to digital goods transferred via a blockchain.

A. Blockchains may be “copies” or “phonorecords” in which works are fixed

The first sale doctrine in § 109(a) states that notwithstanding the right to distribute, “the owner of a particular *copy* or *phonorecord* lawfully made” is protected by the first sale doctrine. If one lawfully owns a copy or phonorecord, they may sell or otherwise dispose of it as they please. Although “copies” and “phonorecords” are defined exclusively of one another, they both share the core elements of being “material objects” in which a work is “fixed by any method now known or later developed,” and from which the work “can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.”¹¹⁶ Phonorecords are defined separately as they pertain specifically to sounds, whereas copies do not.

As applied to digital media, the electronic device in which works are stored is a copy or phonorecord.

[W]hen the purchaser of a digital music file from iTunes possesses that file, embodied ‘for a period of more than transitory duration’ in a computer or other physical storage device [, like their iPhone], . . . that device—or at least the portion of it in which the digital music file is fixed [, like the location on the hard drive]—becomes a phonorecord.¹¹⁷

Thus, an iPhone is a phonorecord because it is a material object in which a song is fixed (downloaded), and from which a song can be perceived (heard).

A blockchain is similarly a copy or phonorecord. As discussed in Section III, a blockchain is best described as a virtual computer residing on a physical network, Ethereum’s network is so large and mature that it is even called a “world computer.”¹¹⁸ Each user also interacts with a blockchain because of its computational utility, such as computing economic data (e.g., transactions). Further, this blockchain consists of any number of physical nodes (i.e., special computers) working together

¹¹⁶ 17 U.S.C. § 101.

¹¹⁷ *ReDigi Inc.*, 910 F.3d at 657.

¹¹⁸ *Ethereum, Smart Contracts, and the World Computer*, CONSENSYS (Oct. 21, 2015), <https://consensys.net/blog/news/programmable-blockchains-in-context-ethereum-smart-contracts-and-the-world-computer/>.

to execute and/or reach consensus on this data,¹¹⁹ in unison.¹²⁰ Some of those computations regard smart contracts, which are programs that can create cryptocurrencies or NFTs. NFTs may represent assets like digital art or music. Further, this art may be stored wholly on-chain or exist off-chain.

If an NFT's metadata (i.e., the digital asset) is stored on-chain, the portion of the blockchain that stores that metadata (e.g., the specific block) is a copy or phonorecord because it resides in a material object—the blockchain network—which is a network of computers maintaining a single virtual computer.¹²¹ Further, copies or phonorecords are fixed permanently since the history of the blockchain is presumptively immutable.¹²² If an NFT's metadata is stored off-chain, the blockchain is not a copy or phonorecord, instead the specific webserver or other, physical, storage device that contains the work's file, in the same manner as an iPhone, is a copy or phonorecord.

If one believes a blockchain is a mere intangible, digital database, one may be misled into thinking it cannot be a copy or phonorecord. Without accounting for a blockchain network's necessary physical network, decision-makers may feel the need to stop any first sale analysis there or feel the need to even amend the law to remove the tangibility requirement.¹²³ A blockchain network is not a mere intangible database because that database is nonetheless stored on every single—tangible—node. The database is the portion of the tangible blockchain network in which a work is stored. Thus, a blockchain is a material object in which a work is fixed.

Since the first sale doctrine applies to “copies” or “phonorecords,” which are material objects in which works are fixed, the first sale

¹¹⁹ ANTONOPOULOS & WOOD, *supra* note 46, at ch. 6; *See also Nodes and Clients*, ETHEREUM, <https://ethereum.org/en/developers/docs/nodes-and-clients/> (Nov. 10, 2022).

¹²⁰ *Consensus Mechanisms*, *supra* note 54. (“Validators create blocks. One validator is randomly selected in each slot to be the block proposer. Their consensus client requests a bundle of transactions as an 'execution payload' from their paired execution client. They wrap this in consensus data to form a block, which they send to other nodes on the Ethereum network. This block production is rewarded in ETH. In rare cases when multiple possible blocks exist for a single slot, or nodes hear about blocks at different times, the fork choice algorithm picks the block that forms the chain with the greatest weight of attestations (where weight is the number of validators attesting scaled by their ETH balance”).

¹²¹ *Supra* notes 50-60 and accompanying text.

¹²² Of course, a work may fail to be “fixed” if a blockchain forks or simply stops existing, such that there are no saved records of the blockchain with the work anywhere. *See Blockchain Forks; Understanding How Crypto Forks Happen*, THE LEGAL EXAMINER (Dec. 10, 2021), <https://www.legalexaminer.com/technology/crypto/blockchain-forks-understanding-how-crypto-forks-happen/>.

¹²³ *See Shaverdian*, *supra* note 17.

doctrine may apply to blockchains since they are physical objects.

B. A “digital first sale” currently exists

The coded functions of a sale or other transfer of an NFT do not always reproduce a copy of a work. For example, an NFT’s smart contract on the Ethereum blockchain must conform to the ERC721 standard. This standard specifies a simple transfer function, which allows people to send, sell, or otherwise dispose of their NFTs as they please. A simplified transfer function from an NFT’s owner is provided below.

```
function transfer(address _to, uint256 _tokenId) external payable;
```

When calling this transfer function (to send an NFT), the owner needs only send a transaction to the NFT’s smart contract address and include two parameters in the transaction: “address _to,” and “uint _tokenId;” which are the recipient and the specific NFT ID respectively. The NFT transfer then occurs within the specific NFT contract state, the contract tracks all changes in ownership. In such a token transfer, no asset is actually “sent” to the recipient of the token. Instead, the new owner’s address is merely recorded within the NFT contract itself.¹²⁴ Therefore, the transfer function did not infringe the reproduction right because ownership of the NFT was merely changed within the NFT- the NFT and the digital asset it referenced were never copied or even moved.

By analogy, Alice owns units 3, 5, and 7 in the *Smarte Contracte* apartment complex. She wishes to transfer unit 3 to Bob. To do so, she physically travels to the *Smarte Contracte* complex, and declares that she, the owner, wishes to transfer unit 3 (“_tokenId”) to Bob (“address _to”). The apartment then records Bob as the new owner of unit 3 in its internal record. An NFT transfer operates similarly to this real property transfer. On a blockchain, Alice transfers Bob her cat NFT by sending a transaction to the NFT’s smart contract containing the necessary data (the recipient and NFT ID); however, most importantly, the transaction does not contain any data or file of the cat picture. That picture had always been stored in the NFT’s smart contract (or off-chain storage, referenced in the contract), just as an apartment unit is forever tethered to the apartment complex. Since the NFT transfer never reproduced or even moved the copyrighted subject matter, the reproduction right was not infringed.

¹²⁴ See ANTONOPOULOS & WOOD, *supra* note 46, at ch. 10.

One may believe that a blockchain is not one single distributed computer but consists of many different disorganized independent computers, much like how the general internet functions. This would lead one to conclude that since an NFT is propagated and spread across each node, it is unlawfully reproduced. However, a blockchain network exists to maintain a single state, and operates as one singular distributed computer, explained in Section III. Even still, the inaccurate belief that a blockchain network is not a singular state machine should not change a first sale analysis because each node is still a material object and thus is an individual copy or phonorecord. The owner of a work deployed as an NFT on a blockchain would then implicitly authorize the reproduction of copies on each node since deployment requires it.

Regardless of whether the NFT's media file is stored on-chain (in the contract), or off-chain (e.g., referenced by a website URL in the contract), the file is never moved or reproduced, title passes within the NFT smart contract itself. Alice, the lawful owner of her copy (a cat NFT), distributed it to Bob via calling a smart contract on a blockchain, without reproducing the work. Moreover, the mere deployment of the NFT does not violate the reproduction right because the blockchain is one singular copy or phonorecord, and Alice otherwise authorized such reproduction. Thus, Alice may transfer Bob ownership of a digital asset *lawfully*, which brings it directly within the purview of the first sale doctrine.

C. Policy reasons to maintain the current language of § 109

A pure, textualist reading of § 109 is the bedrock authority on which all of the above reports rely. Since this same interpretation leads to a clear blockchain-based digital first sale, the many superfluous policy reasons offered against a digital first sale are now rendered toothless. As explained by the 1995 task force, “if the technology utilized allows the transmission of a copy without making an unlawful reproduction—i.e., no copy remains with the original owner—the first sale doctrine *would apply*, and the transmission would not be an infringement.”¹²⁵ This plain language conclusion clearly shows how a blockchain-based digital first sale currently exists. Consequently, it will take congressional action or an acrobatic interpretation of § 109 to result otherwise. In addition, the same policy reasons offered against a digital first sale now even support a blockchain-based digital first sale.

First, a digital first sale once posed a risk of infringement. The 2016 report concluded that “the potential multiplication of copies” has not

¹²⁵ INFO. INFRASTRUCTURE TASK FORCE, *supra* note 80, at 93 (emphasis added).

been ameliorated since the 2001 report.¹²⁶ This conclusion, however, was based on the technology at the time, digital transmissions were boundless, able to be double-spent ad infinitum. This risk, as just discussed, has been dramatically dampened by blockchain technology since one cannot double-spend an NFT.

Although one may still copy and paste an image of an NFT, just as one can scan an identical image of a physical photograph, such unlawful reproduction is simply an economic risk that all copyright owners normally consider, regardless of the medium through which they distribute their works. To outright invalidate all secondary sales of NFTs due to ordinary risks of infringement needlessly narrows the economic choices owners and consumers can take in the marketplace. As the 2001 report claimed, “[s]traight-jacketing copyright owners into a distribution model that developed around a different technology at a different time is a formula for stifling innovative, market-driven approaches to meeting consumer demand for digital content.”¹²⁷ Applied here, allowing NFTs to be subject to restraints on alienation—due to a license-based digital distribution model that developed before blockchain—stifles this innovative technology and reduces consumer choice in the marketplace.

The 2001 report also claimed that it had insufficient data to evaluate the harm to consumers caused by their “inability to resell copies or establish a secondary market.”¹²⁸ However now, we have such data. NFT sales reached \$40 billion in sales in 2021 alone.¹²⁹ This single, staggering statistic of economic activity approximates the loss to consumers to at least \$40 billion.

One similarly inapplicable policy reason was that “perfect [digital] copies” would outcompete physical copies since physical copies can “degrade with time and use,” which makes them less desirable than digital copies.¹³⁰ Notwithstanding the explicit policy goal of furthering free market competition via the first sale doctrine,¹³¹ perfect digital copies are also more desirable for consumers, so copyright holders can simply sell them at a premium. It is otherwise nonsensical to view digital copies as competing with physical copies because they can both originate from the same copyright holder at their own discretion.

The 2001 report also warned that digital copies can be sent around

¹²⁶ INTERNET POL’Y TASK FORCE, U.S. DEP’T OF COM., *supra* note 101, at 67-68.

¹²⁷ U.S. COPYRIGHT OFFICE, REGISTER OF COPYRIGHTS, *supra* note 87, at 101.

¹²⁸ INTERNET POL’Y TASK FORCE, U.S. DEP’T OF COM., *supra* note 101, at 67.

¹²⁹ *NFT sales aim for a \$17.7B record in 2021: Report by Cointelegraph Research*, *supra* note 76.

¹³⁰ PERZANOWSKI & SCHULTZ, *supra* note 10, at 12.

¹³¹ WOLF, *supra* note 127, at 45-46.

the world instantaneously, at minimal cost.¹³² However, the ease with which copyright owners can now instantly place copies in the marketplace at minimal cost and without having to manufacture physical copies, is also a boon to copyright holders, not a hindrance. Blockchain-based digital transfers reflect the best of both worlds, protection of the original creator against unlawful copying by the transferee, and full alienability that enhances a consumer's ability to capitalize on the appreciation of such lawfully purchased NFT's.

The 2001 report further recommended to not embrace a digital first sale doctrine to give the marketplace an opportunity to advance licensing practices.¹³³ The perceived justification was that copyright holders would do so as "rational commercial actors."¹³⁴ Now, more than two decades have passed for the market to embrace licensing regimes that further the policies in the first sale doctrine. The market, however, has grown in its restrictions on downstream distribution, as exposed by the reports.¹³⁵ These warnings have consistently emerged that licensing practices offer one-sided "unilateral contractual provisions," to which consumers must conform.¹³⁶

Indeed, due to the legal and technical limits on enabling a digital first sale, these "rational" commercial actors nevertheless continued to put "constraints on [consumers'] ability to transfer copyrighted material in digital form," such that even "legislative or judicial scrutiny" was considered since first sale protections were at risk of obsolescence.¹³⁷ Due to the inapplicability of the first sale doctrine to an increasingly digital media market, mere licensing has proven insufficient to replace the protections of § 109.¹³⁸ Today, downstream control of digital media

¹³² *Id.* at 82.

¹³³ INTERNET POL'Y TASK FORCE, U.S. DEP'T OF COM., *supra* note 94, at 36.

¹³⁴ INTERNET POL'Y TASK FORCE, U.S. DEP'T OF COM., *supra* note 101, at 4.

¹³⁵ U.S. COPYRIGHT OFF., *supra* note 87, at ix.

¹³⁶ Software-Enabled Consumer Products Study: Notice and Request for Public Comment, 80 Fed. Reg. at 77670.

¹³⁷ CONG. BUDGET OFF., *supra* note 92, at 16-17.

¹³⁸ INFO. INFRASTRUCTURE TASK FORCE, *supra* note 80, at 92-93.

has frustrated consumers to the point of an “end of ownership,”¹³⁹ causing the exact “inconvenience and annoyance to the public” that the first sale doctrine was meant to prevent.¹⁴⁰ Such complete lack of first sale protection makes it crucial for Congress and the courts to clarify that non-infringing blockchain-based digital transfers fall within § 109’s first sale provisions.

VI. CONCLUSION

Unfortunately, due to extensive regulatory history and caselaw barring § 109 from digital transmissions, the blossoming asset class of NFTs is at risk. Without clarification, any unscrupulous NFT creator may invalidate all secondary sales of their NFTs through the outdated reading of § 109. In the short term, the Copyright Office should promulgate guidance to the effect that lawful blockchain-based digital transmissions that do not infringe the reproduction right are afforded § 109 protections. Otherwise, consumers of this multibillion-dollar asset class may be unduly persecuted under misguided and inaccurate readings of § 109.

The legislative history shows that the first sale doctrine was explicitly codified in § 109 to serve “as a statutory bulwark against courts deviating from *Bobbs–Merrill* in a way that increases copyright owners’ control over downstream distribution.”¹⁴¹ Nevertheless, “[i]n a world of increasingly digital distribution, the traditional field of application of the first sale doctrine may disappear, and the resale market become obsolete.”¹⁴² Such absolute, downstream control has consequently proliferated for over two decades, decreasing free market competition and causing the “end of ownership.”¹⁴³ Since blockchain

¹³⁹ PERZANOWSKI & SCHULTZ, *supra* note 10, at 94; *see also* Kevin Westcott et al., *Digital Media Trends, 15th Edition*, DELOITTE (Apr. 16, 2021), <https://www2.deloitte.com/us/en/insights/industry/technology/digital-media-trends-consumption-habits-survey/summary-2021.html> (With more streaming video services, people are finding it increasingly difficult to manage subscriptions, find the entertainment they’re looking for, and balance costs against their tolerance for advertising. “We found that 66% of people were frustrated when content they wanted to watch was removed from a service, and 53% were frustrated by having to subscribe to multiple services to access the content they want. Consumers also face difficulties finding content—a challenge for providers spending billions on new productions. Among respondents, 52% found it difficult to access content across so many services, and 49% were frustrated if a service failed to provide them with good recommendations.”).

¹⁴⁰ *Keeler v. Standard Folding Bed Co.*, 157 U.S. 659, 666-67 (1895); *see also* Westcott et al., *supra* note 139.

¹⁴¹ *Kirtsaeng*, 568 U.S. at 581-2 (Ginsburg, J., dissenting).

¹⁴² INTERNET POL’Y TASK FORCE, U.S. DEP’T OF COM., *supra* note 94, at 37.

¹⁴³ PERZANOWSKI & SCHULTZ, *supra* note 10, at 63.

technology now clearly enables a digital first sale, this fundamental doctrine of “impeccable historic pedigree”¹⁴⁴ must no longer be sidestepped. Indeed, a digital first sale for blockchain-based transmissions already exists through a plain language, textualist reading of § 109.

¹⁴⁴ *Kirtsaeng*, 568 U.S. at 538.