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2023 ELI WRITING CONTEST ESSAY WRITTEN BY AMANDA SHARP

ADDRESSING THE MUSIC INDUSTRY'S BIGGEST BROKEN RECORD: WHY BLOCKCHAIN, SMART CONTRACTS, AND NFTS ARE AN UNMATCHED SOLUTION TO THE MUSIC INDUSTRY'S $424 MILLION UNMATCHED ROYALTY PROBLEM

I. INTRODUCTION

A customer enters a bakery and orders a chocolate chip cookie. The customer eats the cookie and then tells the baker they will pay for the cookie . . . in six months. The discrepancy here, between when the customer eats the cookie and when the baker is paid, is objectively unreasonable. Society would never let this type of behavior to go unadmonished. However, if two substitutes are made to this example—a musical composition replaces the cookie, and a songwriter replaces the baker—the crippling implications prolonged music royalty distribution can have on a songwriter's career become evident.

The most important component of the music industry has always been creators. Songwriters create recipes that record labels use to create wonderful dishes an unlimited number of people can sample. These individuals rely on complete, timely data being reported, because proper royalty allocation and compensation is dependent on accurate information being universally available.[1] But many entities in the music royalty distribution process store song data differently. These database discrepancies create incomplete, inconsistent data entries that result in lost wages, data duplication, and unmatched or unclaimed musical works.[2]

In 2018, Congress attempted to address the slow, incomplete royalty distribution process through the enactment of the Music Modernization Act ("MMA").[3] The MMA established the Mechanical Licensing Collective ("MLC") to simplify the mechanical royalty regulation process

[1] See Leticia Trandafir, *Everything Musicians Need to Know About Music Distribution*, LANDR BLOG (Jan. 12, 2021), https://blog.landr.com/everything-musicians-need-know-digital-music-distribution/ [https://perma.cc/22Y2-T84Q] for an in-depth discussion on the music creation and distribution process.

[2] Unclaimed works refer to inadequate information regarding the writer's and the publisher's shares in a composition. *See* U.S. COPYRIGHT OFFICE, UNCLAIMED ROYALTIES: BEST PRACTICES FOR THE MECHANICAL LICENSING COLLECTIVE (July 2021). Unmatched recordings implicate the recording artist and record label. *See FAQs: The MLC*, THE MLC https://www.themlc.com/faqs/categories/mlc [https://perma.cc/7B2Q-Y3GQ].

[3] The MMA offered a more efficient way for streaming services to pay for music rights by creating a blanket mechanical license that granted specific, limited protections to streaming services playing full catalogs of music provided by distributors and record labels. *See* Orrin G. Hatch-Bob Goodlatte Music Modernization Act of 2018, PUB. L. NO. 115-264, 132 Stat. 3676 (codified as amended at 17 U.S.C. § 101).

and make copyright ownership data more transparent.[4] However, after the MLC distributed its first round of mechanical royalty payments in 2021, almost half a billion dollars of unmatched royalties remained.[5] Retroactive fixes to treat the symptoms of a broken system have been attempted, but the industry needs a proactive solution to eradicate the underlying issue.

New leaps in technology, like smart contracts and non-fungible tokens ("NFTs") housed on blockchains, can make music royalty distribution more transparent and the data collection process more reliable and immune to manipulation or delays.[6] This Comment argues that the MMA and MLC's initiatives are a great start, but they will not get the industry to a comprehensive music royalty distribution finish line. There are still $424 million in unmatched royalties being held by the MLC, and the process of matching royalties to artists remains slow and arduous.[7] Part II explores the history of music royalty regulation and identifies the main issue keeping the current system from functioning efficiently: inconsistent metadata tracking and lack of a uniform database to house accurate data. Part III proposes a solution to this problem: an MLC-operated blockchain that tracks song metadata, via NFTs, and tracks copyright royalty splits, via smart contracts, to facilitate smart royalty distributions and make copyright ownership more transparent. Finally, Part IV summarizes how utilizing these innovative methods, in conjunction with the MLC's current

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[4] *The Mechanical Licensing Collective (MLC)*, COPYRIGHT ALLIANCE https://copyrightalliance.org/trending-topics/mechanical-licensing-collective/ [https://perma.cc/D7QW-CFN9] ("The MLC's mission is to ensure that songwriters, composers, lyricists, and music publishers receive accurate and timely mechanical license royalty payments from streaming and download services across the U.S. To fulfill this goal, the MLC built a publicly accessible musical works database, along with a portal that creators and music publishers can use to submit and maintain their musical works data. It also developed a number of other related tools to ensure that the process of registering with the MLC (and tracking royalties through it) is a smooth and seamless process."). The MLC created a public database of musical works, sound recordings, and copyright owners, hoping to fix a system that had generated $2.5 billion in unclaimed royalties. R.B. Jefferson, *What Do the MMA and MLC mean for Songwriters and Composers in 2021?*, LAWYERS ROCK (Dec. 18, 2020), https://www.lawyersrock.com/what-do-the-mma-and-mlc-mean-for-songwriters-and-composers-in-2021/ [https://perma.cc/X3CY-RZF9]. While the MLC was created to rectify the problems around unmatched recordings, it only focuses on mechanical royalties and not public performance royalties. *See id.* The MMA granted a blanket license to streaming services, and the MLC oversees administrating and monitoring the use of those licenses. *Id.* A blanket license is issued by a collection society allowing a user to play and/or perform all compositions or recordings managed by all publishers represented by that group. *Blanket License*, SONGTRUST https://www.songtrust.com/music-publishing-glossary/glossary-blanket-license [https://perma.cc/Q6XW-LQBC].

[5] $424,384,787 to be exact. LB Cantrell, *The MLC Receives $424 Million in Historical Unmatched Royalties From DSPs*, MUSICROW (Feb. 16, 2021), https://musicrow.com/2021/02/the-mlc-receives-424-million-in-historical-unmatched-royalties-from-dsps/ [https://perma.cc/FY59-ZWCE]. See *infra* note 38 for a discussion on where these accrued historical unmatched royalties came from.

[6] *See infra* Part III.

[7] In the current system, a creator must wait months to receive compensation. See *infra* note 21 for a discussion on the exact timeline.

initiatives, would accomplish autonomous, transparent, and instantaneous music royalty distribution while eradicating the creation of future unmatched and unclaimed works.

II. A (TUNING) FORK IN THE ROAD: MUSIC COPYRIGHT OWNERSHIP AND ROYALTY REGULATION

A. Musical Copyrights—Musical Composition and Sound Recording

Every song has two copyrightable layers—a musical composition and a sound recording.[8] Musical compositions are the totality of underlying notes, lyrics, and melody that make up a song, create publishing rights, and result in public performance royalties.[9] Sound recordings are the songs that result from the musical composition, create master rights, and result in mechanical royalties.[10] The metadata within the composition and sound recording is what ensures contributing parties are paid when songs get played.

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[8] U.S. COPYRIGHT OFFICE, COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES (3d. ed. 2021). There are four music royalties: public performance royalties, mechanical royalties, synchronization royalties, and print music royalties. Rory PQ, *How Music Royalties Work in the Music Industry*, ICON COLLECTIVE (Mar. 30, 2020), https://iconcollective.edu/how-music-royalties-work/ [https://perma.cc/SRQ9-7KFL]; *see also* Dmitry Pastukhov, *How Does the Music Industry Work? Introducing the Mechanics: A 10 Part Series*, SOUNDCHARTS BLOG (Jan. 7, 2019), https://soundcharts.com/blog/mechanics-of-the-music-industry [https://perma.cc/9XWC-RJN2]. Synchronization and print music royalties will not be discussed, but they are key components of the music royalty equation. Dmitry Pastukhov, *BMI vs ASCAP vs SESAC: What PROs Do (and How they Measure Up)*, SOUNDCHARTS BLOG (Feb. 18, 2020), https://soundcharts.com/blog/bmi-vs-ascap [https://perma.cc/JL6E-3QUM]. Synchronization royalties result from synchronizing a specific song with some form of visual media. PQ, *supra* note 8. These types of royalties are managed by artists and their managers or labels. For example, while it costs the same to play a Taylor Swift song and a new artist's song on the radio or on a streaming service, using a Taylor Swift song *in an advertisement* will cost you millions more than using an unknown artist's work. *See* Dmitry Pastukhov, *Music Publishing 101: Copyrights, Publishing, Royalties, Common Deal Types, & More*, SOUNDCHARTS BLOG (Nov. 20, 2019), https://soundcharts.com/blog/how-the-music-publishing-works [https://perma.cc/7FH9-HVBC]. Printed music royalties are much less common in the digital age. PQ, *supra* note 8. The number of sheet music copies physically made determines the amount of royalties the copyright holder will receive. *Id.*

[9] FAQs, *supra* note 2 ("Sometimes referred to as a composition or song, a musical work consists of music, including any accompanying lyrics.").

[10] 17 U.S.C. § 101. Sound recordings and their rights typically belong to the owner of the "master" and these master rights have historically been held by record labels. *See* Pastukhov, *Music Publishing 101: Copyrights, Publishing, Royalties, Common Deal Types, & More*, *supra* note 8. Even though record label frequently own the master rights to a sound recording, they cannot own the publishing rights in the composition. *Id.*

However, no uniform standard currently exists to link a musical composition to its subsequent sound recordings. While musical compositions are tracked using one system,[11] sound recordings are tracked using another.[12] Without a consistent data standard and a central location to find all copyright ownership information, slow, incomplete royalty distribution will continue as will the creation of unmatched and unclaimed works.[13]

B. Music Industry Entity Breakdown

The music industry can be grouped into three silos: the music-creation entities, the business intermediaries, and the customer-facing entities. On the music-creation side, there are singers, songwriters, and musicians who create the composition; then, there are producers, record labels, and recording artists who turn that composition into a sound recording.[14] The business

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[11] An International Standard Music Code ("ISWC") tracks musical compositions. *International Standard Music Code*, WIKIPEDIA https://en.wikipedia.org/wiki/International_Standard_Musical_Work_Code [https://perma.cc/DX9T-DANB]; *see also* Peter Schneider, *What are ISWC/ISRC Codes and How do I Get Them?*, SONGTRADR (Sept. 6, 2016), https://blog.songtradr.com/what-are-iswc-isrc-codes-and-how-do-i-get-them/ [https://perma.cc/6QA2-AQXN]. ISWCs are unique codes assigned to a specific musical composition allowing for easy identification within recordings and proper royalty distribution. *Id.* ISWC codes track the song title, songwriter(s), music publisher(s), and the ownership/publisher shares in the piece. *Id.*

[12] An International Standard Recording Code ("ISRC") tracks a sound recording. *International Standard Recording Code*, WIKIPEDIA https://en.wikipedia.org/wiki/International_Standard_Recording_Code [https://perma.cc/QZR2-JCP6]. The standard for music identification across all entities is to track the sound recording code but not the music composition code. *See* Dmitry Pastukhov, *How Broken Metadata Affects the Music Industry (And What We Can Do About It)?*, SOUNDCHARTS BLOG (July 15, 2019), https://soundcharts.com/blog/music-metadata [https://perma.cc/KA23-AVJ3]; *see also* Henry Schoonmaker, *What's the Difference Between ISRCs and ISWCs?*, SONGTRUST (Apr. 6, 2020), https://blog.songtrust.com/isrc-iswc-song-registration-tips [https://perma.cc/K2ZH-VLAA] ("Publishers, collection societies, record labels, distributors, and [DSPs] use ISRCs to match master recordings to [] compositions.").

[13] While the ISWC works with 54 registration agencies across 79 countries to issue ISWC codes to musical compositions, the current system has only registered and assigned codes to 52 million works. *See A Unique Identifier of Musical Works Across the World*, ISWC NETWORK https://www.iswc.org/ [https://perma.cc/X4LK-573C]. It is estimated there are at least 97 million songs in the world. Brian Clark, *How Many Songs are There in the World? (2022)*, MUSICIANWAVE (Apr. 28, 2022), https://www.musicianwave.com/how-many-songs-are-there-in-the-world/ [https://perma.cc/6T3B-UV4Q] ("Considering the fact that the web has about 97 million songs on average shown by Google, while Spotify states they have 82 million, it is safe to assume that music only continues to grow."). Thus, nearly half of all sound recordings are not currently accounted for or adequately tracked. *See id.*

[14] *See* PQ, *supra* note 8.

intermediaries are distributors, collective rights organizations, and publishers.[15] Finally, there are customer-facing entities that generate and pay public performance or mechanical royalties for the use of a song.[16] The two main customer-facing entities are venues and streaming services.

C. Broken (Metadata) Records and Copyright Ownership Data—CDs to MP3s

Digital music data collection has been flawed since its inception.[17] When CDs were introduced in 1980, they had minimal space to store information, so only basic song data was

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[15] Distributors are a bridge between streaming services and labels, getting music in front of the right listeners, on the right platforms, at the right time to ensure royalties are delivered to the rights owners by condensing the customer-facing entity information into manageable royalty allocation data. *See* Pastukhov, *Music Publishing 101: Copyrights, Publishing, Royalties, Common Deal Types, & More*, *supra* note 8. Publishers work with songwriters to register a composition and use licensing fees to make sure writers get paid. *Id.* Mechanical Royalty Organizations ("MROs") collect mechanical royalties and issue rights to anyone distributing copyrighted musical compositions. *Mechanical Rights Organization (MRO)*, SONGTRUST https://www.songtrust.com/music-publishing-glossary/glossary-mechanical-rights-organization [https://perma.cc/4BTW-9FML]. Performing Rights Organizations ("PROs") license an artist's rights to music users, monitor the use, and collect the resulting public performance royalties. Diana Akin Scarfo, *Music Publishing 101: What's a Performance Rights Organization (PRO)?*, REVERBNATION BLOG (Aug. 29, 2016), https://blog.reverbnation.com/2016/08/29/music-publishing-101-whats-a-performance-rights-organization-pro/ [https://perma.cc/8SL5-73CK]. The three main PROs in the United States are American Society of Composers, Authors, and Publishers ("ASCAP"), Broadcast Music, Inc. ("BMI"), and Society of European Stage Authors and Composers ("SESAC"). *See* Pastukhov, *BMI vs ASCAP vs SESAC: What PROs Do (and How they Measure Up)*, *supra* note 8.

[16] An example of a venue is a bar, restaurant, concert hall, radio station, or other location where you hear music. Streaming services, often referred to as Digital Service Providers (DSPs), are entities like Apple Music or Spotify. FAQs, *supra* note 2. While venues are just responsible for reporting public performance royalties, DSPs must track and distribute three different types of payments to copyright owners: (1) mechanical royalties to the recording artist and record label from all specific streams from a song; (2) public performance royalties paid to the songwriter and the publisher for every *public* performance that occurs; and (3) payment to recording owners such as labels or distributors. Soundcharts Team, *What Music Streaming Services Pay Per Stream (And Why It Actually Doesn't Matter)*, SOUNDCHARTS BLOG (June 26, 2019), https://soundcharts.com/blog/music-streaming-rates-payouts [https://perma.cc/6VAV-8UWG].

[17] *See* Ryan Waniata, *The Life and Times of the Late, Great CD*, DIGITALTRENDS (Feb. 7, 2018), https://www.digitaltrends.com/music/the-history-of-the-cds-rise-and-fall/ [https://perma.cc/FL6Y-C3JA] ("While CDs have been on their way out for some time now, this week's news may as well be a eulogy or the once-mighty disc, signaling a last step in its passing from a dominant medium to a forgotten relic in the ever-changing pantheon of recorded music."); *see also* Anne S. Huffman, *Note: What the Music Modernization Act Missed, and Why Taylor Swift Has the Answer: Payments in Streaming Companies' Stock should be Dispersed Among all the Artists at the Label*, 45 IOWA J. CORP. L. 537 (Winter 2020) (recommending record labels and artists find contractual solutions to ensure artists are being paid adequately for their

tracked on the actual disk.[18] Thus, when CDs were digitized into MP3 files in the late 1990s, minimal data was available to transfer.[19] No uniform collection process existed, so the early digital music databases often lacked key information about the song rights they were distributing. This built a digital universe of poorly archived MP3 files on a foundation of inconsistent data.[20]

Despite technology's massive evolution over the decades, the incompatible metadata standards have never been fixed. Musical databases still store data differently making transfer between parties inefficient and sometimes impossible. Inconsistent data standards, and the lack of a uniform database to track song information and engagement, also means there is a substantial interval between when a song is played and when the creator gets paid—typically between three months and a year.[21] A slow, incomplete compensation process will persist if the music industry

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work). There are two types of metadata required to create a comprehensive music database: ownership metadata and description metadata. Pastukhov, *supra* note 12. Ownership metadata ensures correct royalty allocation occurs by tracking the percentages owed to each music-creation entity involved in a composition's creation. *See id.* Errors in this type of data are devastating to creators as they lose both monetary compensation and credit and are often called "artist credits" because it is a crucial way for an individual artist to gain traction and notoriety within the industry. *Id.* One way to ensure artists are protected has been the creation and implementation of songwriter split sheets. Rory PQ, *Everything You Need to Know about a Split Sheet*, ICON COLLECTIVE (May 4, 2020), https://iconcollective.edu/songwriter-split-sheet/ [https://perma.cc/Z28U-UFX8]. Descriptive metadata tracks details about a specific sound recording and collects information about song title, release date, track number, performing artist, cover art, and main genre. Pastukhov, *supra* note 12. Errors in this data result in misspelled song names, mixed up release dates, and other inadequacies that create unmatched works or delayed royalty distribution. *See* U.S. Copyright Office, *supra* note 2.

[18] The case and lyric pamphlet that accompanied the CD carried more specific data like an artist's publishers, recording label, songwriters, etc. *See* Ryan Waniata, *The Life and Times of the Late, Great CD*, DIGITALTRENDS (Feb. 7, 2018), https://www.digitaltrends.com/music/the-history-of-the-cds-rise-and-fall/ [https://perma.cc/FL6Y-C3JA].

[19] Waniata, *supra* note 18.

[20] Pastukhov, *supra* note 12 ("Imagine that a database receives a value in the field "Back Vocalist" — when its own corresponding column is called "Back Vocals". Algorithms won't be able to make that match (unless there's a specific rule for it) and in 99% of the cases, the back vocalist's credit will just get scraped. A big chunk of metadata gets lost on its way through the music data chain.").

[21] Seth Lorinczi, *Publishing Royalties: The Waiting Game*, SONGTRUST (Aug. 1, 2019), https://blog.songtrust.com/music-publishing-royalties-the-waiting-game [https://perma.cc/Q2WU-WXWJ]. ASCAP has an average payout of 6.5 months. *Id.* BMI is not much better with an average of 5.5 months. *How We Pay Royalties*, BMI https://www.bmi.com/creators/royalty/general_information [https://perma.cc/6NBL-9JHK]. ASCAP uses a complex credit system to determine how much each artist, producers, etc. receives in royalties (credits x share x credit value = royalty). *How ASCAP Calculates Royalties*, ASCAP https://www.ascap.com/help/royalties-and-payment/payment/royalties [https://perma.cc/4EXM-94YQ]; *see also Turning Performances Into Dollars*, ASCAP https://www.ascap.com/help/royalties-and-payment/payment/dollars [https://perma.cc/QK54-39YD].

continues to store metadata without a universal standard.[22] Blockchain, smart contracts, and NFTs could implement a cohesive song data collection system that streamlines the royalty distribution process, provides creators more protection, and eradicates the creation of future unmatched or unclaimed works.

III. How Blockchain, Smart Contracts, and NFTs Can Revolutionize Royalty Regulation and Distribution in the Music Industry

A. A Universal Database With A Uniform Standard—The MLC Blockchain

The MLC's purpose is to ensure the public has access and ownership over the songs it engages with, but errors within the industry's song data, while preventable, are much too common.[23] A smart digital royalty system—employing blockchain, smart contracts, and NFTs to track musical metadata—would ensure creators get paid faster. An MLC blockchain is the best way to ensure musical metadata is tracked in one central place using one uniform standard.[24] This process would save time and money by optimizing data collection and erasing the current hours of labor spent rectifying data discrepancies.

Blockchains are digitally distributed ledgers known for their decentralization, transparency, and immutability.[25] Instead of storing all the information related to a transfer within

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[22] See Trandafir, *supra* note 1 for an in-depth discussion on the music creation and distribution process. Streaming services add to this problem by not allowing direct music uploads, requiring creators to engage with distributors to help get their songs heard. Soundcharts Team, *The Mechanics of Music Distribution: How it Works, Types of Music Distribution Companies + 35 Top Distributors*, Soundcharts Blog (June 29, 2022), https://soundcharts.com/blog/music-distribution [https://perma.cc/5BHB-LRLA]. The reason behind the apparent lack of artist autonomy is credited to an "unstandardized metadata and payout distribution" system making individual artist input impossible. *Id.*

[23] The MLC's official website states that it does not have any current plans to incorporate blockchain technology into its systems. FAQs, *supra* note 2 ("Will blockchain be used in the management of The MLC data? The MLC does not have any current plans to incorporate blockchain technology into the systems.").

[24] This would create uniform standards for inputting data to ensure accurate, transparent data is being recorded to the blockchain. *See* Rafael Fuentes, *What is Sharding and How is it Helping Blockchain Protocols?*, RootStrap (Sept. 6, 2022), https://www.rootstrap.com/blog/what-is-sharding-and-how-is-it-helping-blockchain-protocols/ [https://perma.cc/A5LJ-ZKW3] ("Sharding is a process that divides the whole network of a blockchain . . . into several smaller networks, referred to as 'shards.'"). Sharding and sidechains address scalability issues while decreasing environmental/economic burden on validators by only requiring them to maintain certain subsets of the data on the connecting chains (typically the root hash). *Id.* Rollups are key to successful implementation of sharding. Robert Stevens, *What Are Rollups? ZK Rollups and Optimistic Rollups Explained*, CoinDesk (Sept. 7, 2022, 10:25 AM), https://www.coindesk.com/learn/what-are-rollups-zk-rollups-and-optimistic-rollups-explained/ [https://perma.cc/P2S7-VAFR].

[25] Essentially, a blockchain is the digital version of transaction receipts. *See* Niaz Chowdhury, Inside Blockchain, Bitcoin, and Cryptocurrencies 215 at 13–14 (2020) ("There is no dependence on a single server; hence blockchain does not have a central point of failure.").

one central computer, a blockchain network stores the information across multiple computers.[26] Decentralization assures that one computer failing does not negatively affect the system, because the other computers continue supporting it.[27] Blockchains are transparent, because all transactions are recorded and viewable to anyone with internet access, while the record's immutability ensures all on-chain assets are accounted for when transferred.[28]

Blockchain networks are managed by individual computers called validator nodes ("nodes"), but viewable to anyone granted access.[29] Blockchains eradicate data errors by employing consensus mechanisms that require at least 51% of a chain's nodes to confirm the information's accuracy before it can be recorded on the blockchain.[30] The main MLC blockchain,

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There are private, public, and consortium blockchains. *Private, Public, and Consortium Blockchains: The Differences Explained*, COINTELEGRAPH (2021), https://cointelegraph.com/explained/private-public-and-consortium-blockchains-the-differences-explained/amp [https://perma.cc/M7XY-RWV6]. The type of blockchain impacts the three key features mentioned above. *Id*. Anyone can access public blockchains, but they are truly decentralized which can increase security risks. *Id.* Private blockchains are the exact opposite: only open to limited operators. *Id.* Consortium blockchains are the best of both worlds and would allow the MLC to oversee creation and operation of the blockchain, while ensuring information could only be added to the chain by those with a copyright interest in the work being logged (i.e., music creators, publishers, record labels, and recording artists, etc.).

[26] *What is Decentralization*, WE TEACH BLOCKCHAIN, https://weteachblockchain.org/faq/what-is-decentralization/ [https://perma.cc/GTP7-LZKT]; *see* CHOWDHURY, *supra* note 25 at 13–14 (2020) ("There is no dependence on a single server; hence blockchain does not have a central point of failure.").

[27] John Evans, *What is a Node in a Blockchain Network*, NODES.COM, https://nodes.com/ [https://perma.cc/RA5Q-74WW]. *See* Jimi S., *Blockchain: What are Nodes and Masternodes?*, MEDIUM: COINMONKS (Sept. 5, 2018), https://medium.com/coinmonks/blockchain-what-is-a-node-or-masternode-and-what-does-it-do-4d9a4200938f [https://perma.cc/26KU-RPF6].

[28] *See* CRYPTO DUKEDOM, THE NFT REVOLUTION: MUSIC EDITION 20 (2021); *see infra* note 31 (discussing on-chain versus off-chain transactions).

[29] Validator nodes are authorities on the blockchain that can submit data for consideration to be entered on the chain. *See* Jimi S., *supra* note 27; *see also* CHOWDHURY, *supra* note 25 ("A fundamental problem in distributed systems is achieving overall system reliability in the presence of some faulty nodes. . . . Blockchain being a distributed system requires its nodes to reach a consensus while running the system and keeping its data secure.").

[30] While Proof of Work and Proof of Stake are the most common blockchain consensus methods, the blockchain argued for in this paper would use a Proof of Authority ("PoA") consensus method. Simon Chandler, *Proof of Stake vs. Proof of Work: Key Differences Between These Methods of Verifying Cryptocurrency Transactions*, BUSINESS INSIDER (Nov. 21, 2022, 1:12 PM), https://www.businessinsider.com/personal-finance/proof-of-stake-vs-proof-of-work [https://perma.cc/FH27-GEUQ]; *see also Proof-of-Authority vs. Proof-of-Stake: Key Differences Explained*, COINTELEGRAPH https://cointelegraph.com/blockchain-for-beginners/proof-of-authority-vs-proof-of-stake-key-differences-explained [https://perma.cc/4BBP-ZU2B] ("The PoA consensus process grants a few [] players the authority to validate network transactions and update [the chain] . . . . The PoA consensus differs from the [Proof of Stake] in that it uses identity rather than the digital assets . . . . Thus, a person's reputation is more valuable than their

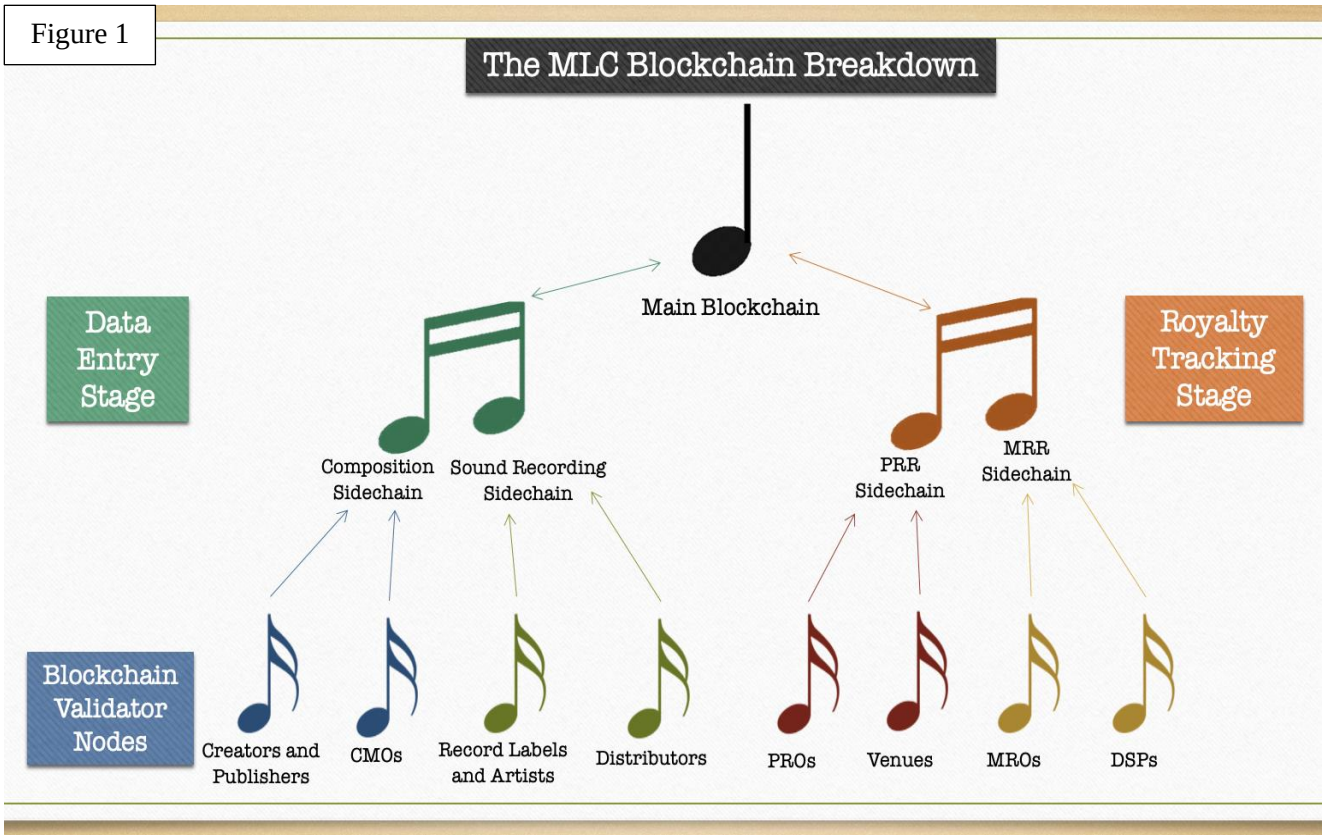
alongside four sidechains, would implement consensus mechanisms to track music metadata from across the industry and ensure it was recorded accurately. The main blockchain would be governed by the MLC to ensure all parties are using a uniform standard when inputting data. The MLC would screen music-creation entities, business intermediaries, and customer-facing entities who apply to become blockchain nodes.[31] Additionally, there would be four sidechains: (1) a chain run by publishers, creators, and CMO nodes to log music composition data ("Composition sidechain"); (2) a chain run by record labels, recording artists, and distributor nodes to log sound recording data

possessions . . . Validators are pre-approved by a group of "authorities" to verify transactions and build new blocks. To be trusted, validators must adhere to a set of requirements."). PoA would also help create censorship-resistant records. William M. Peaster, *A Beginner's Guide to ETH Validators*, BANKLESS (Sept. 20, 2022), https://newsletter.banklesshq.com/p/a-beginners-guide-to-eth-validators [https://perma.cc/7CAK-Q2N9].

[31] There are two types of blockchain transactions: on-chain transactions and off-chain transactions. *See* Rohan Pinto, *On-Chain Versus Off-Chain: The Perpetual Blockchain Governance Debate*, FORBES (Sept. 6, 2019, 8:00 AM), https://www.forbes.com/sites/forbestechcouncil/2019/09/06/on-chain-versus-off-chain-the-perpetual-blockchain-governance-debate/?sh=525fc1a61f5e **[**https://perma.cc/DUT3-DZEA]; *see also* William M. Peaster, *NFTs and the On-Chain Spectrum*, BANKLESS (Feb. 4, 2021), https://metaversal.banklesshq.com/p/nfts-and-the-on-chain-spectrum **[**https://perma.cc/W3RH-FURJ]. On-chain transactions are more secure, but they take up more space on the system and cost a lot more. *See* Jake Frankenfield, *On Chain Transactions (Cryptocurrency)*, INVESTOPEDIA (Aug. 24, 2021), https://www.investopedia.com/terms/c/chain-transactions-cryptocurrency.asp [https://perma.cc/HTJ6-4ZW7]. Off-chain transactions are the simpler, cheaper way to get something logged on the blockchain, but they are less secure. *See* Amanda J. Sharp, *Head in the BitCloud: A Discussion on the Copyrightability and Ownership Rights in Digital Art and Non-Fungible* Tokens, 59 SAN DIEGO L. REV. (forthcoming Jan. 2023) (discussing the key differences between these transaction types).

("Sound Recording sidechain"); (3) a chain tracking mechanical royalty accumulation ("MRR sidechain"); and (4) a chain tracking public performance royalty accumulation ("PRR sidechain").[32]

Figure 1



As Figure 1 shows, each sidechain would play a role in achieving complete data tracking and distribution. The Composition sidechain would ensure creators and publishers are accounted for and eradicate unclaimed works. The Sound Recording sidechain would ensure record labels, recording artists, and distributors are compensated and eliminate unmatched works. The MRR sidechain would verify correct mechanical royalty data is processed, while the PRR sidechain would track venue logs and guarantee accurate public performance royalties are distributed.[33]

To ensure good faith participation by all entities, the MLC should require business intermediaries and customer-facing entities to stake a portion of their profits on the chain. Staking

[32] Sidechains are compatible independent blockchains that use a universal code as their base layer to allow smart contracts created on the sidechains to be deployed on the main chain. *See Execution Layer (EL) and Consensus Layer (CL) Node Clients (2022)*, ALCHEMY (July 8, 2022), https://www.alchemy.com/overviews/execution-layer-and-consensus-layer-node-clients [https://perma.cc/XUT8-7XFV]. Blockchain rollups condense a sidechain's most important information into a data summary that gets posted on the main chain for future reference and tracking purposes. *Id.*

[33] The MLC blockchain would function on a Proof of Authority consensus model that allows for the input of data, execution of data validation mechanisms, and approval of validator nodes to run the side and subchains. See *supra* note 30 for a discussion on blockchain consensus methods and Proof of Authority.

nodes would contribute money to a fund that runs the blockchain and maintain its security, with the staked contributions being returned to the proper entities on a rolling basis.[34] Staking aligns the parties' interests by rewarding nodes when the system performs successfully and incentivizes all entities to achieve faster, fairer royalty distributions. Nodes that attempt to log incorrect data will be warned, suspended, or banned from future reporting. Additionally, the MLC could make future ownership dispute claims contingent on a showing that reasonable effort was taken by the music-creation individuals to input correct ownership data when first registering the work. This would incentivize music-creation entities to contribute comprehensive composition and sound recording data on the sidechains or risk losing the chance to dispute inaccuracies later.

Blockchains are built to be decentralized, transparent, and immutable. Decentralization ensures accurate information remains available in a universal database. Transparency allows all parties to access real-time royalty information. Immutability ensures all entities are engaging with identical, complete data sets. The MMA laid the groundwork for streamlined royalty regulation and distribution; blockchain technology can transform its ideas into tangible solutions.

B. Consistent, Automatic Royalty Distribution—Smart Contracts

Smart contracts can eliminate the data inaccuracies and inefficiencies that occur when using paper contracts.[35] Smart contracts are neither smart nor contracts; rather, they are computer codes that aid the blockchain in recording transactions accurately by automatically executing terms set in a multiparty agreement.[36] Smart contracts are tamper-resistant, self-executing, and self-verifying.[37] Historically, paper contracts have outlined the terms negotiated between parties, but their creation is prone to human data errors and requires parties to sign separate documents and pay separate transaction fees.[38] Smart contracts decrease delay by executing all necessary functions

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[34] Staking is like placing money in a high-yield savings account. Krisztian Sandor, *Crypto Staking 101: What is Staking?*, COINDESK (Nov. 22, 2022, 9:43 AM), https://www.coindesk.com/learn/crypto-staking-101-what-is-staking/ [https://perma.cc/67SH-JLGP]; *see also Ethereum 2.0 Staking: A Beginner's Guide on How to Stake ETH*, COINTELEGRAPH https://cointelegraph.com/ethereum-for-beginners/ethereum-2-0-staking-a-beginners-guide-on-how-to-stake-eth [https://perma.cc/8RGT-LJ4W].

[35] Employing an intermediary in the contracting process increases the cost and slows down the processing time putting an unfair, and unnecessary, burden on the artist. *See* Deltech Bank and Trust, *Smart Contracts and Financial Services*, DELTEC BANK (Feb. 15, 2022), https://www.deltecbank.com/2022/02/15/smart-contracts-and-financial-services/ [https://perma.cc/9J4R-5PWS].

[36] Blockchain revolutionized the application of smart contracts by creating a shared database that runs on a decentralized protocol allowing both parties to validate the transaction instantaneously and facilitating the auto-execution of the smart contract code without the input of a third-party intermediary. John Ream, et. al, *Upgrading Blockchains: Smart Contract Use Cases in Industry*, DELOITTE (June 9, 2016), https://www2.deloitte.com/us/en/insights/focus/signals-for-strategists/using-blockchain-for-smart-contracts.html [https://perma.cc/MTN5-FBFW].

[37] Deltech Bank and Trust, *supra* note 35.

[38] The music royalty black box is a $2.5 billion economy where unclaimed, unmatched, delayed, and other types of unpaid streaming royalties live. Paul Resnikoff, *Welcome to the 'Royalty Black Box,' the Music Industry's $2.5 Billion Underground Economy*, DIGITAL MUSIC NEWS

in one single transaction making separate fees and documents unnecessary. The automated nature of smart contracts makes them instantaneous, and since they require no intermediaries to execute transactions, they ensure transparency between parties by assuming the burden of transaction validator and executor.[39]

C. Music Mediums Revisited—CDs to MP3s to NFTs

To really improve the music royalty system, the industry must embrace non-fungible tokens as a new form of music medium. NFTs are unique data strings that provide public proof of asset ownership.[40] Similar to how a barcode on an item marks the price, tracks inventory of that item, and can be referenced to verify that an authentic purchase has occurred, NFTs can track digital asset ownership and verify a transaction's authenticity.[41] NFTs can link smart contracts and blockchain technology to accomplish the MLC's goal of uniform data tracking and streamlined royalty distribution.[42] Through unique blockchain aspects like digital addresses and digital wallets, NFTs could create automatic royalty distribution potential by connecting royalty splits to the creators' bank accounts.[43] A digital address is similar to, but more secure than, a social media username—it links to a user's transaction history, cryptocurrency balance, and NFT collection.[44] A digital wallet attaches to a digital address and acts as a storage facility for all NFTs, cryptocurrency, and other digital assets attributed to that address.[45]

(Aug. 3, 2017), https://www.digitalmusicnews.com/2017/08/03/music-industry-royalty-black-box/ [https://perma.cc/K6CH-3Y9C]; *see also Unmatched Royalties*, FAIR TRADE MUSIC INTERNATIONAL https://www.fairtrademusicinternational.org/campaigns/unmatched-royalties/ [https://perma.cc/TC4T-83NE].

[39] The smart contracts used on the MLC blockchain would be written in the BWARM Code—a code implementation created by the MLC and its partners. *Bulk Database Feed*, THE MLC https://www.themlc.com/bulk-database-feed [https://perma.cc/8KWN-FJTE].

[40] *See* DUKEDOM, *supra* note 25; *see* Georgina Adam, *But is it Legal? The Baffling World of NFT Copyright and Ownership Issues*, ART NEWSPAPER (Apr. 6, 2021), https://www.theartnewspaper.com/2021/04/06/but-is-it-legal-the-baffling-world-of-nft-copyright-and-ownership-issues [https://perma.cc/R5T5-RFRG] ("An NFT is just a link to a work of art stored on another platform . . . .").

[41] DUKEDOM, *supra* note 25, at 7.

[42] Matthieu Nadini et al., *Mapping the NFT Revolution: Market Trends, Trade Networks and Visual Features*, 11 SCI. REPS Article No. 20902 (2021); Luis Gallardo, *Web3—Community, Ownership, Decentralization, Utility*, WORLD HAPPINESS FOUND. (Apr. 13, 2022), https://worldhappiness.foundation/blog/happiness/web3-community-ownership-decentralization-utility/ [https://perma.cc/SH6B-8G8B].

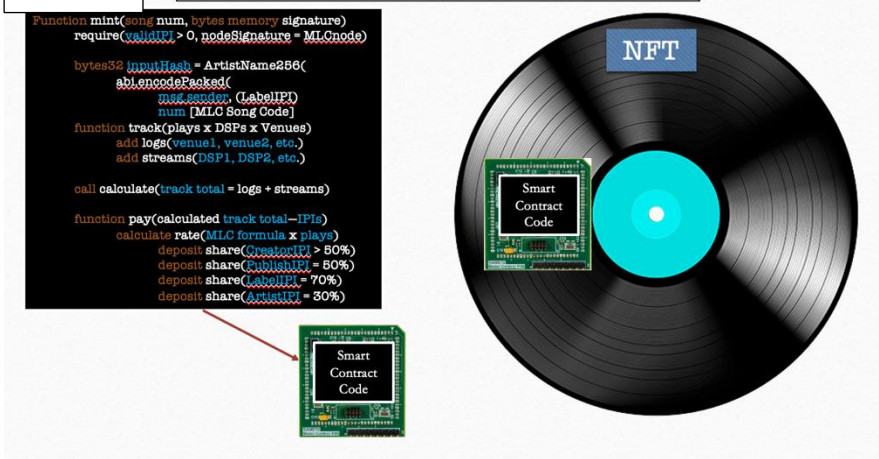
[43] Each creator's IPI would be linked to a digital wallet and address to streamline royalties. Interested Party Information ("IPI") codes are artist-specific tracking codes given to songwriters, composers, and publishers. *All About IPI Numbers*, ASCAP https://www.ascap.com/help/registering-your-music/ipi-faqs [https://perma.cc/V59Y-HYAT]. IPI codes are only assigned to songwriters, composers, and music publishers. *Id.*

[44] *See* Sharp, *supra* note 31.

[45] *Id.*; *see also* Henrique Centieiro, *All You Need to Know: NFT Wallets—Custodial vs. Non-Custodial*, MEDIUM: LEVEL UP CODING (Sept. 30, 2021), https://levelup.gitconnected.com/all-

When a composition is created, the music-creation entities would input copyright data into an MLC template on the Composition sidechain that generates a smart contract programmed to execute a specific royalty split when the distribution function is called (see Figure 2). That composition's smart contract—including a breakdown of ownership shares and creator information—would then be recorded on the Composition sidechain, rolled up and logged on the main blockchain, and included in each subsequent sound recording (see Figure 3).[46]

Figure 2 Smart Contract Code Implementation



Then, when a record label records a song, that specific sound recording's royalty splits and song information would be added to the composition's smart contract code (see Figure 4). This ensures automatic, immutable attachment of the sound recording to the composition for future royalty distribution purposes while eradicating future unmatched works. The completed song's smart contract (including both composition and sound recording royalty allocation data) would be minted as an NFT on the Sound Recording sidechain and tracked on the main blockchain.

Figure 3 Music Composition Metadata

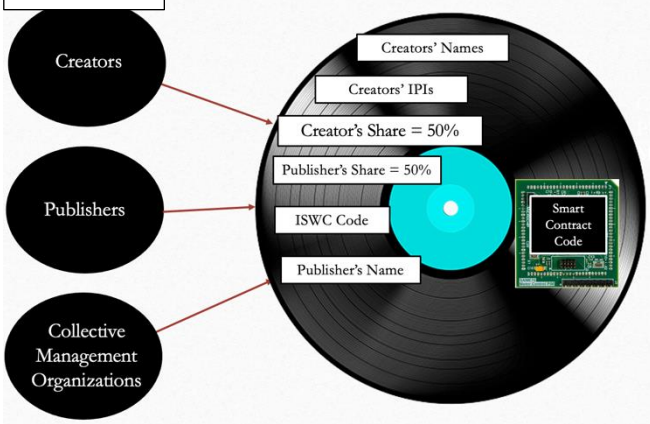
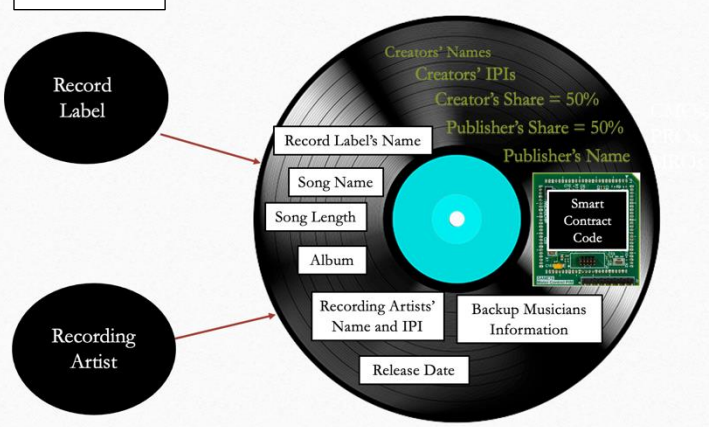


Figure 4 Sound Recording Metadata



you-need-to-know-nft-wallets-custodial-vs-non-custodial-e4bdb0c50889 [https://perma.cc/Y8BH-UH5L]. See *Best NFT Wallets for 2022*, ASCENT (Aug. 1, 2022), https://www.fool.com/investing/stock-market/market-sectors/financials/non-fungible-tokens/nft-wallet/ [https://perma.cc/T72N-LB3V] to learn more about the different digital wallets available.

[46] *See supra* notes 24 and 32 for more information about rollups.

Customer-facing entities engaging with the NFT (i.e., playing the song) would trigger the smart contract to record the use, retain the proper funds from the right customer-facing party, and distribute the earned royalties to the allocated creators' digital wallets. Incorporating smart contract terms regarding what parties owe money and what parties receive money revolutionizes the royalty collection process, while using an NFT to connect a song's ownership data to a creator's digital wallet enables instantaneous royalty distribution (see Figure 5 and 6).

Figure 5

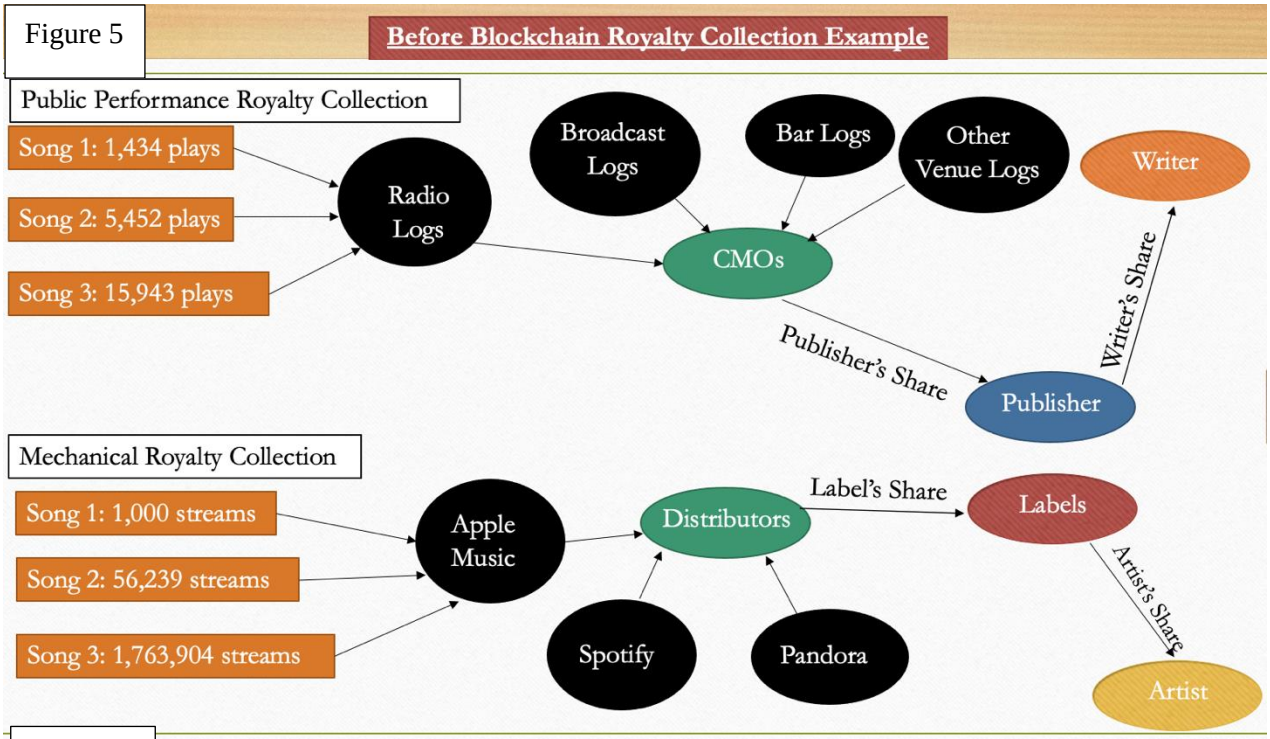
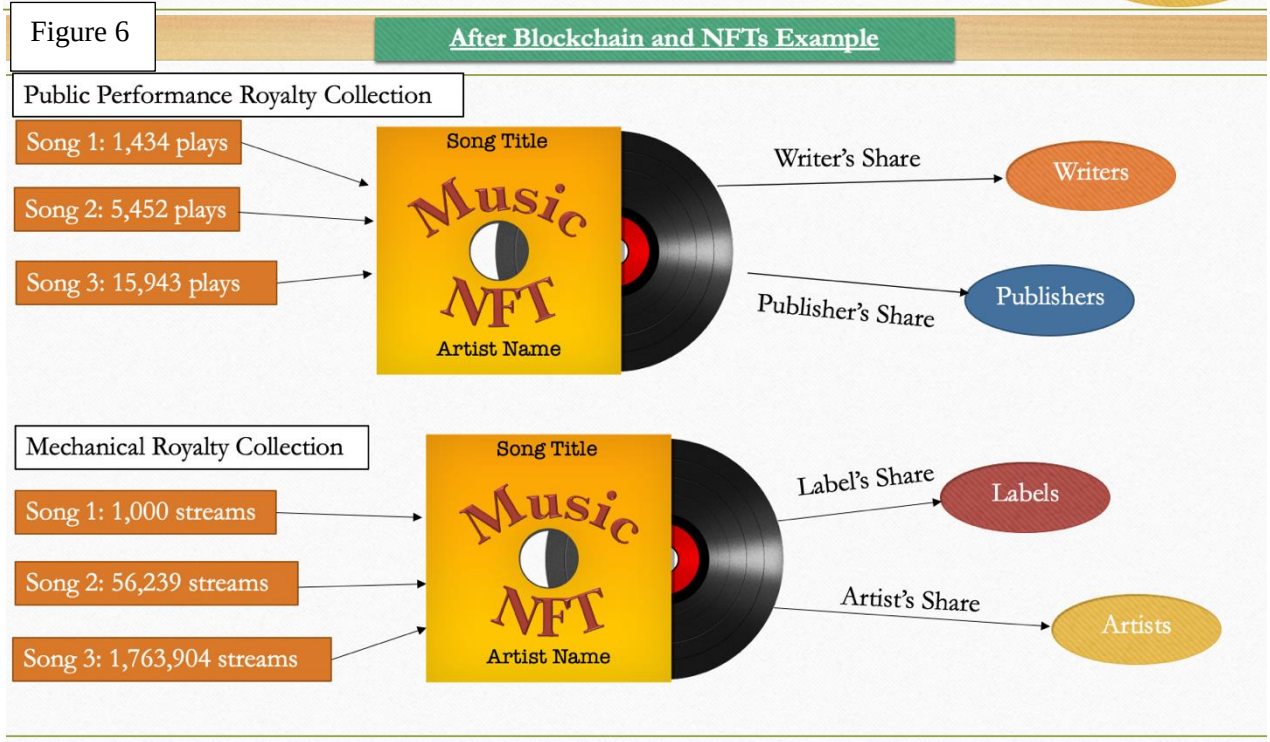


Figure 6



IV. CONCLUSION

The most important component of the music industry has always been creators. By employing blockchain technology, smart contracts, and NFTs, the MLC can honor its purpose, mend the broken metadata record, and rectify a problem that has plagued an industry dependent on transparency, collaboration, and innovation. Implementing uniform metadata standards confirms every contributor is receiving proper credit, while uploading this data to a central blockchain creates a consistent record of ownership data. Deploying smart contracts ensures creators no longer have to wait months for money they are entitled to today. Connecting songs to NFTs would guarantee that unmatched and unclaimed works are no longer created while promoting a uniform, transparent process to log copyright ownership data.

A customer enters a bakery and orders a chocolate chip cookie. The customer scans a card and the cookie's price is automatically deducted from their bank account and transferred to the baker. The cookie sale is logged in the bakery's inventory to track sales and demand for future orders. The baker is paid for their efforts. The customer eats the cookie. There is a digital log of the transaction, from creation to consumption, and no discrepancy exists. Efficient markets already require these standards for exchanges of goods and services. Now, the MLC must adopt these principles and make three key changes: (1) create a blockchain with a uniform data standard to replace the current inconsistent databases; (2) use smart contracts for autonomous royalty distribution; and (3) implement NFTs to track and connect the smart contracts to the blockchain. When this is done, the vast problems prolonged music royalty distribution has historically created will be eradicated, and the broken metadata record that has played on repeat for decades will finally be fixed.