

SMART ROYALTIES: TACKLING THE MUSIC INDUSTRY'S COPYRIGHT DATA DISCREPANCIES THROUGH BLOCKCHAIN TECHNOLOGY, SMART CONTRACTS, AND NON-FUNGIBLE TOKENS

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ABSTRACT

Blockchain technology, smart contracts, and non-fungible tokens (“NFTs”) can create faster, more transparent royalty regulation and distribution for music creators while improving the initiatives set forth in the Music Modernization Act of 2018 (the “MMA”). No one likes a broken record, but the music industry’s system for royalty collection and distribution has been disjunct, inefficient, and incomplete since the digitization of CDs into MP3 files in the 1990s. There have only been retroactive fixes to treat the symptoms of a broken system with no proactive solutions to identify the cause of the underlying issues and eradicate them. This article analyzes the incomplete history of digitizing musical metadata and highlights how vital comprehensive royalty regulation is to creators by considering the ramifications unmatched and unclaimed works have on these individuals. The article proposes three initiatives to address the inconsistent metadata standard currently disrupting digital music consumption: (1) the creation of an MMA-specific blockchain that provides uniform, transparent data standards; (2) the implementation of smart contracts to facilitate autonomous royalty distribution; and (3) the utilization of NFTs to connect smart contract functionality with blockchain’s uniformity.

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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 unacceptable. Society would never let this type of behavior 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 of prolonged music royalty distribution 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 that an unlimited number of people can sample. These individuals rely on accurate data transfer—how frequently a song has been played—to receive proper royalty compensation. However, each entity involved in today’s music royalty distribution process stores song data differently. These database discrepancies create incomplete, inconsistent data entries that result in lost wages, data duplication, and unmatched or unclaimed works.¹ Inaccurate data not only leads to songwriters not getting paid but also to songwriters not receiving credit and recognition for their talents. In an industry founded on creative collaborations and networking, not giving credit to the proper individuals can have a devastating impact on a creator’s career.²

New leaps in technology, like smart contracts and non-fungible tokens (“NFTs”) housed on blockchains, can make the music royalty distribution process more transparent and the data collection governing music copyright ownership more reliable and immune to manipulation and delays.³ Royalty allocation is dependent

¹ Unclaimed works refer to inadequate information regarding the writer’s and the publisher’s shares in a composition. See U.S. COPYRIGHT OFF., UNCLAIMED ROYALTIES: BEST PRACTICES FOR THE MECHANICAL LICENSING COLLECTIVE 43 (2021), <https://www.copyright.gov/policy/unclaimed-royalties/unclaimed-royalties-final-report.pdf> [<https://perma.cc/9THL-NU4R>]. Thus, every time a master recording is played, the songwriters and publisher will not receive compensation. See *Frequently Asked Questions*, THE MLC, <https://www.themlc.com/faqs/categories/mlc> [<https://perma.cc/7B2Q-Y3GQ>] (last visited Mar. 23, 2023). Unmatched recordings implicate the recording artist and record label. See *id.*

² Catherine L. Fisk, *Credit Where It’s Due: The Law and Norms of Attribution*, 95 GEO. L.J. 49, 76 (2006).

³ See *infra* Section IV (discussing NFTs and smart contracts).

on accurate information being available, but the current system lacks a uniform data standard, resulting in a slow, and at times incomplete, compensation process.⁴

Congress attempted to address these issues by enacting the Music Modernization Act of 2018 (the “MMA”).⁵ 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.⁶ In July 2019, the U.S. Register of Copyrights designated the Mechanical Licensing Collective (the “MLC”) to simplify the mechanical royalty regulation process and make copyright ownership data more transparent.⁷ A Board of Directors—comprised of ten music publishers and four professional songwriters—make up the MLC governance structure.⁸ Three Advisory Committees (the

⁴ 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>] (providing an in-depth discussion on the music creation and distribution process); *see also infra* note 21.

⁵ Orrin G. Hatch-Bob Goodlatte Music Modernization Act of 2018, Pub. L. No. 115-264, 132 Stat. 3676 (2018) (codified as amended at 17 U.S.C. § 101).

⁶ *Governance and Bylaws*, THE MLC, <https://www.themlc.com/governance> [<https://perma.cc/9L73-EB42>] (last visited Mar. 23, 2023); *see also Frequently Asked Questions*, *supra* note 1.

⁷ *See Frequently Asked Questions*, *supra* note 1.

⁸ *Governance and Bylaws*, *supra* note 6 (“[The MLC] is led by a Board of Directors that is comprised of fourteen individuals: ten must be representatives of music publishers and four must be professional songwriters who retain and license mechanical rights for songs they have written. No two Directors may be affiliated with music publishers under common control or ownership. There are also three nonvoting Directors representing trade organizations for songwriters, music publishers, and digital music providers, respectively.”).

“Committees”) aid the MLC’s Board of Directors in executing its objectives: the Unclaimed Royalties Oversight Committee,⁹ the Dispute Resolution Committee,¹⁰ and the Operations Advisory Committee.¹¹ These Committees help serve the MLC’s “purposes, operations, or other activities or topics,” but their exact roles are not clearly defined in the current MLC bylaws.¹² When the MLC became the exclusive administrator of the MMA’s blanket license program, it was tasked with collecting royalties owed by the streaming services and distributing those royalties to the correct rightsholders.¹³

The MLC also 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 by making copyright ownership information more transparent and accessible to the public.¹⁴ However, after

⁹ This committee is composed of five songwriters and five music publishing representatives. *Id.*

¹⁰ This committee is composed of five songwriters and five music publishing representatives. *Id.*

¹¹ This committee is composed of six music publishing representatives and six digital music provider representatives. *Id.*

¹² See THE MLC, BYLAWS OF THE MECHANICAL LICENSING COLLECTIVE 13 (2020), <https://f.hubspotusercontent40.net/hubfs/8718396/files/2020-05/Bylaws%20of%20The%20MLC.pdf> [<https://perma.cc/SW7W-98YY>].

¹³ 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>] (last visited Mar. 23, 2023); THE MLC, 2021 ANNUAL REPORT 1 (2021), <https://www.themlc.com/hubfs/Marketing/23856%20The%20MLC%20AR2021%206-30%20REFRESH%20COMBINED.pdf> [<https://perma.cc/BS5B-7DK4>].

¹⁴ 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->

the MLC distributed its first round of royalty payments in 2021, nearly half a billion dollars of unmatched royalties remained.¹⁵ While the MLC was a positive step toward reliable digitization of the music royalty system, significant gaps in accomplishing a cohesive data tracking protocol remain. The MLC created a system to identify some unclaimed works and regulate mechanical royalty distribution, yet it failed to provide a proactive solution that can minimize future unmatched works and does not address the three other types of music royalties at all.¹⁶

The MLC's initiatives are an important step, but they are not the solution that will get the industry to a comprehensive music royalty distribution finish line. Hundreds of millions of dollars in unmatched royalties are still held by the MLC, and the number is set to grow as the process of matching royalties to artists remains slow and arduous.¹⁷ Blockchain technology, smart contracts, and NFTs can be implemented to streamline the music royalty distribution system. Smart contracts would track copyright

RZF9]. The MLC also implemented a system called SoundExchange to track satellite and digital radio logs. *Id.* SoundExchange is a state-of-the-art music fingerprinting technology that records radio broadcasts and then cross-checks those streams with a database of 68 million songs to record public performance royalties. *Who We Are*, SOUNDEXCHANGE, <https://www.soundexchange.com/who-we-are/> [https://perma.cc/XN87-9UTX] (last visited Dec. 13, 2022).

¹⁵ The exact value of unmatched royalties remaining is \$424,384,787. 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-dsp/> [https://perma.cc/FY59-ZWCE]; see *infra* notes 41–46 and accompanying text (discussing the cause of accrued historical unmatched royalties).

¹⁶ See *infra* note 21 (discussing public performance royalties, synchronization royalties, and print music royalties).

¹⁷ In the current system, a creator must wait months to receive compensation. See *infra* Section II(B) (providing additional information regarding the specific entities involved in this process).

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ownership information while NFTs would store song metadata, and both would be recorded and tracked on an MLC-specific blockchain. Utilizing these innovative methods, in conjunction with the MLC's current initiatives, would accomplish autonomous, transparent, and instantaneous royalty distribution.

Section II of this article establishes the two types of musical copyrights—musical compositions and sound recordings—and silos the music industry's entities into three categories: music-creation entities, business intermediaries, and customer-facing entities. Section III 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. Section IV proposes a solution to this problem: an MLC-operated blockchain that employs NFTs (tracking song metadata) and smart contracts (tracking copyright ownership splits) to facilitate smart royalty distributions. Finally, Section V summarizes the benefits of the proposed solutions and argues that utilizing blockchain technology, smart contracts, and NFTs would fulfil the MLC's purpose to simplify the royalty regulation process and make copyright ownership transparent for all users.¹⁸

¹⁸ *The Mechanical Licensing Collective (MLC)*, COPYRIGHT ALLIANCE, <https://copyrightalliance.org/trending-topics/mechanical-licensing-collective/> [<https://perma.cc/D7QW-CFN9>] (last visited Mar. 23, 2023) (“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.”).

II. A [TUNING] FORK IN THE ROAD: COPYRIGHT LAW, MUSIC 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.¹⁹ Musical compositions are the totality of underlying notes, lyrics, and melody that make up a song.²⁰ Musical compositions create publishing rights that result in public performance royalties paid to the creator and their publisher.²¹ A sound

¹⁹ U.S. COPYRIGHT OFF., COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES § 802.2(B) (3d ed. 2021), <https://www.copyright.gov/comp3/docs/compendium.pdf> [<https://perma.cc/62E8-RJQW>].

²⁰ *Id.*; see also *Frequently Asked Questions*, *supra* note 1 (“Sometimes referred to as a composition or song, a musical work consists of music, including any accompanying lyrics.”).

²¹ 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) [hereinafter Pastukhov, *Music Industry*], <https://soundcharts.com/blog/mechanics-of-the-music-industry> [<https://perma.cc/9XWC-RJN2>]. Synchronization and print music royalties will not be discussed in this paper, 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) [hereinafter Pastukhov, *PROs*], <https://soundcharts.com/blog/bmi-vs-ascap> [<https://perma.cc/JL6E-3QUM>]. Synchronization royalties result from synchronizing (“pairing”) a specific song with some form of visual media. PQ, *supra*. 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.

recording is the song that results from a musical composition.²² Sound recordings create master rights that result in mechanical royalties paid to the record label and the recording artist.²³ Currently, no uniform standard exists to link a musical composition and its sound recordings. While musical composition data is tracked using one system,²⁴ sound recording data is tracked using another.²⁵

Dmitry Pastukhov, *Music Publishing 101: Copyrights, Publishing, Royalties, Common Deal Types, & More*, SOUNDCHARTS BLOG (Nov. 20, 2019) [hereinafter Pastukhov, *Music Publishing 101*], <https://soundcharts.com/blog/how-the-music-publishing-works> [<https://perma.cc/7FH9-HVBC>]. Additionally, both the composition and sound recording owners must agree to the use and the resulting royalty is shared between the recording and publishing sides. *Id.* Printed music royalties are much less common in the digital age. PQ, *supra*. The number of sheet music copies physically made determines the amount of royalties the copyright holder will receive. *Id.*

²² 17 U.S.C. § 101. Sound recordings and their rights typically belong to the owner of the “master” and are key in reproduction and distribution uses. PQ, *supra* note 21. Historically, record labels have held master rights because they are the ones paying for the studio time that the recording artist uses to create the sound recording. *See id.*

²³ Master rights attach to a specific sound recording. *See* Pastukhov, *Music Publishing 101*, *supra* note 21. Labels then use contracts to leverage the recordings of their artists in return for royalty payments over a specific period, while a recording artists signed to the label will receive a flat rate or percent of the mechanical royalties that result. *See id.* Even though record label frequently own the master rights to a sound recording, they cannot own the publishing rights in the composition. *Id.*

²⁴ An International Standard Music Code (“ISWC code”) tracks musical compositions. ISWC NETWORK, <https://www.iswc.org/> [<https://perma.cc/WEN3-LBYR>] (last visited Apr. 24, 2023); *International Standard Music Code*, WIKIPEDIA, https://en.wikipedia.org/wiki/International_Standard_Musical_Work_Code [<https://perma.cc/DX9T-DANB>] (last visited Mar. 23, 2023); *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

The critical information within the composition and sound recording metadata ensure that contributing parties receive payment when songs are played. Slow, incomplete royalty distribution will continue without a consistent data standard and a central location to find all copyright ownership information.²⁶ Additionally, discrepancies in

allowing for easy identification within recordings and proper royalty distribution. *Id.* These codes track the song title, songwriter(s), music publisher(s), and the ownership/publisher shares in the piece. *Id.*

²⁵ An International Standard Recording Code (“ISRC code”) tracks sound recordings. ISRC, <http://usisrc.org/> [<https://perma.cc/U5BA-S94A>] (last visited Apr. 24, 2023); *International Standard Recording Code*, WIKIPEDIA, https://en.wikipedia.org/wiki/International_StandardRecording_Code [<https://perma.cc/QZR2-JCP6>] (last visited Mar. 23, 2023). To create an ISRC code, an artist must pay \$80. See Schneider, *supra* note 24. 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.”). The MLC has also created its own tracking system for the works in its database—MLC Song Codes. See *The MLC Public Work Search*, THE MLC, <https://portal.themlc.com/search#work> [<https://perma.cc/9WBB-94HY>] (last visited Apr. 24, 2023) (allowing a user to search by MLC song code).

²⁶ 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>] (last visited Mar. 23, 2023). 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

ownership data can lead to the creation of unmatched recordings or unclaimed works.²⁷ When a sound recording's data is not adequately matched to its underlying musical work, an unmatched recording results.²⁸ Unmatched royalties implicate the recording artist and the record label.²⁹ Unclaimed works result when less than 100% of a musical work's ownership shares have been claimed.³⁰ Thus, every time a sound recording with inadequate data is played, the songwriter and/or publisher will not receive proper compensation because either the musical work is not connected to the sound recording, or the initial data about ownership in the musical work was not allocated properly.

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 the compositions and sound recordings that result are not currently accounted for or adequately tracked. *See id.*

²⁷ See *Frequently Asked Questions*, *supra* note 1.

²⁸ *Id.*

²⁹ See U.S. COPYRIGHT OFF., *supra* note 1, at 28. (“Other commenters stated that certain songwriters may not have ‘heard of a PRO or . . . publisher,’ know about standard unique identifiers (e.g., ISWCs or ISRCs), understand the roles of PROs versus U.S. government-designated collectives (SoundExchange and the MLC), or know that they do not need to be signed to a record label or publishing company to participate in royalty collection and distribution systems.”) (internal citations omitted).

³⁰ *Id.* (“For example, if only 80% of a musical work has been claimed, the remaining 20% is unclaimed, and the royalties associated with the unclaimed shares are referred to as unclaimed royalties.”).

B. Music Industry Entity Breakdown

Main Music Industry Parties		
Music-Creation Side	Business Intermediaries	Customer-Facing Side
<ul style="list-style-type: none"> • Composers • Songwriters • Singers • Producers • Labels 	<ul style="list-style-type: none"> • CMOs → Collective Management Organization • PROs → Performing Rights Organizations <ul style="list-style-type: none"> ◦ ASCAP, BMI, and SESAC • MROs → Mechanical Royalties Organizations <ul style="list-style-type: none"> ◦ MLC • Publishers • Distributors 	<ul style="list-style-type: none"> • Venues <ul style="list-style-type: none"> ◦ Bars ◦ Live Concerts • Digital Media Streaming Providers (DSPs) <ul style="list-style-type: none"> ◦ Apple Music ◦ Spotify

The music industry can be grouped into the three silos shown in Figure 1: the music-creation entities, the business intermediaries, and the customer-facing entities. On the music creation side, singers, songwriters, and musicians create the composition.³¹ There are also producers, record labels, and recording artists who turn that composition into a sound recording.³² The business intermediaries are distributors, streaming services, collective rights organizations, and publishers. Distributors are a bridge between streaming services and labels.³³ Publishers work with songwriters to register a composition

³¹ See *id.*

³² See PQ, *supra* note 21.

³³ Distributors get music in front of the right listeners, on the right platforms, at the right time and ensure royalties are delivered to the copyright owners by condensing the customer-facing entity information into manageable royalty allocation data. See Pastukhov, *Music Publishing 101*, *supra* note 21. Distributors are a crucial part of the recording chain with three key roles: distribute releases to DSPs, allocate royalties appropriately, and create a marketing approach for specific songs or clients. *Id.* Music distributors are now digital infrastructure providers and rights administrators rather than just supply chain managers. *Id.* They use their power as “bulk representatives” to negotiate deals most favorable to the artists they represent. *Id.*

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with a collective rights organization and use licensing fees to make sure writers get paid.³⁴ Collective rights organizations track, collect, and distribute royalties owed to artists and creators.³⁵ Finally, there are customer-facing entities. Venues generate and pay public performance royalties for the public use of a song.³⁶ Streaming services generate mechanical royalties from the streaming of a song

³⁴ Publishers bring compositions to record labels who might produce the work into a sound recording. *Id.* Music publishers can obtain a license to use the songwriting copyright in exchange for royalty privileges. *Id.* Publishers are crucial for songwriters and producers who write songs for other artists as these individuals' focus is on the success of the underlying work and not the resulting sound recording. *Id.*

³⁵ Mechanical Royalty Organizations (“MROs”) collect mechanical royalties and issue rights to anyone reproducing or distributing copyrighted musical compositions. *Music Publishing Glossary: Mechanical Royalty Organizations (“MROs”)*, SONGTRUST, <https://www.songtrust.com/music-publishing-glossary/glossary-mechanical-rights-organization> [https://perma.cc/4BTW-9FML] (last visited Mar. 24, 2023). The Harry Fox Agency or the Mechanical Licensing Committee (the “MLC”) established under the MMA are examples of MROs. 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, *PROs*, *supra* note 21. PROs rely on metadata logged by DSPs, radio stations, and other public performance venues to determine the royalty rates and payout amounts for each artist. *Id.*

³⁶ An example of a venue is a bar, restaurant, concert hall, radio station, or other location where you hear music.

and must distribute the collected royalties to the proper parties.³⁷

III. ADDRESSING THE MUSIC INDUSTRY'S BIGGEST BROKEN [DATA] RECORD: INCONSISTENT MUSIC METADATA STANDARDS AND LACK OF COMPREHENSIVE DATABASE

A. *Musical Mediums—Records to CDs to MP3s*

The initial digital music data collection method had major flaws.³⁸ When CDs were introduced in 1980, they

³⁷ Streaming services, often referred to as Digital Service Providers (“DSPs”), are entities like Apple Music or Spotify. *Frequently Asked Questions*, *supra* note 1. 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. *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>]. Each group is made up of many individuals. For brevity, these groups will be referenced broadly when applicable.

³⁸ 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, 538, 546–47 (2020) (recommending that record labels and artists find contractual solutions to ensure artists are being paid adequately for their work).

had minimal space to store data, so only basic song information was tracked on the actual disk.³⁹ Thus, when CDs started to be digitized into MP3 files in the late 1990s, minimal data was available to upload.⁴⁰ Unfortunately, there was no uniform data collection process during this period, so dozens of databases with differing standards resulted.⁴¹ This lack of standardization meant that the early-2000s digital music databases lacked key information about the underlying rights in the songs they were distributing. These factors built a digital universe of poorly archived MP3 files on a foundation of inconsistent data that continues today.⁴²

Despite the massive evolution of technology since MP3 files were introduced, the incompatible metadata standards have never been fixed. Most musical databases still vary significantly in how they store copyright data making the transfer between parties inefficient and sometimes impossible. The industry is essentially playing a game of telephone, attempting to translate data that is not compatible from one entity to another. Inconsistent data

³⁹ The case and lyric pamphlet that accompanied the CD carried more specific data regarding specific publishers, recording label, songwriters, etc. See generally Spencer Paveck, Note, *All the Bells and Whistles, but the Same Old Song and Dance: A Detailed Critique of Title 1 of the Music Modernization Act*, 19 VA. SPORTS & ENT. L.J. 74 (2019) (discussing a detailed history of the music industry's adaption to the rapidly-changing digital environment); Jillian J. Dahrooge, Note, *The Real Slim Shady: How Spotify and Other Music Streaming Services Are Taking Advantage of The Loopholes Within the Music Modernization Act*, 21 J. HIGH TECH. L. 199 (2021).

⁴⁰ Waniata, *supra* note 38.

⁴¹ See Pastukhov, *supra* note 25 (“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.”).

⁴² *Id.*

standards and the lack of a uniform database to track song information and engagement create a substantial lag between when a song gets played and when the creator gets paid, typically between three months and a year depending on the entities involved.⁴³

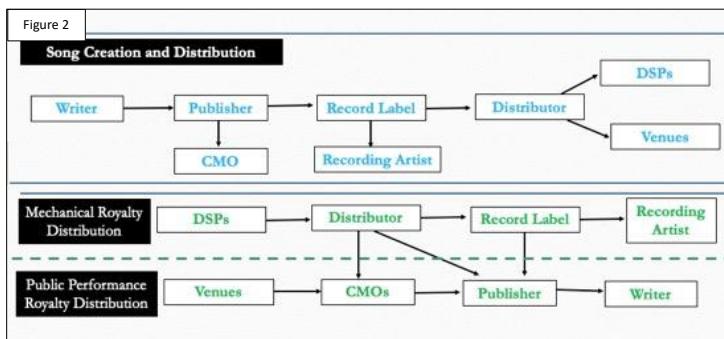
Compounding the technical translation delays is the lack of incentive for business intermediaries to relay collected royalties to the creators, because if the money remains unclaimed, the default is that these entities keep it.⁴⁴ The MMA attempted to address this disconnect by

⁴³ 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 to publishers, and by extension its artists, of 6.5 months. *Id.*; see *supra* note 35 (defining ASCAP). BMI has an average payout of 5.5 months. *How We Pay Royalties*, BMI, https://www.bmi.com/creators/royalty/general_information [https://perma.cc/6NBL-9JHK] (last visited Mar. 24, 2023); see *supra* note 35 (defining BMI). ASCAP collects metadata about work registration such as title, writer, and/or publisher. It also uses a complex credit system to determine how much each party receives in royalties (credits × share × credit value = royalty). *How ASCAP Calculates Royalties*, ASCAP, <https://www.ascap.com/help/royalties-and-payment/payment/royalties> [https://perma.cc/4EXM-94YQ] (last visited Mar. 24, 2023); see also *Turning Performances Into Dollars*, ASCAP, <https://www.ascap.com/help/royalties-and-payment/payment/dollars> [https://perma.cc/QK54-39YD] (last visited Mar. 24, 2023). ASCAP employs a census versus sample survey approach, meaning it unintentionally discounts the artist's actual royalty realization because it is not economically beneficial for ASCAP to perform a census for a certain song or genre. See *The ASCAP Surveys*, ASCAP, <https://www.ascap.com/help/royalties-and-payment/payment/surveys> [https://perma.cc/3QDD-HAVD] (last visited Mar. 24, 2023). As a result, the artist will get incorrect royalties based on a sample rather than actual plays of their work. *Id.*; see also *Keeping Track of Performances*, ASCAP, <https://www.ascap.com/help/royalties-and-payment/payment/keepingtrack> [https://perma.cc/S5JZ-62HU] (last visited Mar. 24, 2023).

⁴⁴ Chris Castle, *Best Practices for Unmatched Royalties*, MUSIC TECH. POL'Y BLOG (June 24, 2014), <https://musictechpolicy>

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allowing streaming services to avoid *some* future liability if they turned over all unpaid, unclaimed royalties that had accrued through 2018.⁴⁵ However, under the current system, distributors still remain an unnecessary bridge collecting and relaying royalties between streaming services and record labels, while publishers do the same between the collective rights organizations and the actual creators, as seen in Figure 2.⁴⁶



.com/2014/06/24/best-practices-for-unmatched-royalties/ [https://perma.cc/6Z8P-687V] (“We should not be surprised that services have a great incentive to sit on the songwriter’s money and not spend any additional efforts to find the songwriters.”).

⁴⁵ 20 DSPs transferred accrued historical unmatched royalties to the MLC. *The Mechanical Licensing Collective Receives \$424 Million in Historical Unmatched Royalties from Digital Service Providers*, THE MLC (Feb. 16, 2021), https://blog.themlc.com/press/mechanical-licensing-collective-receives-424-million-historical-unmatched-royalties-digital [https://perma.cc/TX6E-W9QL].

⁴⁶ Since April 2016, there have been over 46 million cases filed with the United States Copyright Office involving unidentified songwriters. Asaf Deke, *Data Has A Lot To Say About Music Royalties, All You Need To Do Is Listen*, BRIGHT DATA, https://brightdata.com/blog/brightdata-in-practice/data-and-music-royalties [https://perma.cc/3BJD-CXGV] (last visited Mar. 24, 2023).

B. Broken [Metadata] Records and Copyright Ownership

There are two types of metadata required to create a comprehensive music database: ownership metadata and description metadata.⁴⁷ Ownership metadata ensures correct royalty allocation occurs by tracking the percentages owed to each music-creation entity involved in a composition’s creation. Errors in this type of data are devastating to creators as they lose both monetary compensation and credit.⁴⁸ Descriptive metadata tracks details about a specific sound recording.⁴⁹ Errors in this data result in misspelled song names, mixed up release

⁴⁷ Pastukhov, *supra* note 25.

⁴⁸ *Id.* In fact, this type of data is often called “artist credits” because it is a crucial way for an individual artist to gain traction and notoriety within the industry. *See 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>]. The default for these agreements is that ownership of a co-written work will be equally divided among the contributors unless a split sheet is agreed upon. *Id.* This default helps circumvent legal headache by requiring all contributors to sit down and determine, in writing, what the ownership split will be from the outset. *Id.* Without a split sheet, contributors risk never getting paid or receiving credit for their input because PROs will not know who to pay. *Id.* A split sheet must include the date, song title, legal names of all contributing writers involved, role in the song creation (producer, songwriter, etc.), ownership percentage for each contributor, specific contributions (lyrics, hook, melody, beats, etc.), record label (if applicable), PRO (if applicable), publishing company (if applicable), mailing addresses and contact information for contributing parties, and written signature of each contributor. *Id.*

⁴⁹ Pastukhov, *supra* note 25. Description metadata collects information about song title, release date, track number, performing artist, cover art, and main genre. *Id.*

dates, and other inadequacies that create unmatched works or delayed royalty distribution.⁵⁰

However, despite the 2018 enactment of the MMA and the MLC, there has been no attempt at music data standardization even though the MLC's own website states “[t]he MLC has the support of organizations from every corner of the music industry.”⁵¹ The MLC acknowledges that “record companies are not required to directly deliver their sound recording data to the MLC,” and without a uniform system in place requiring all parties to use a consistent standard, data discrepancies and prolonged royalty distribution will persist.⁵² If the music industry continues to store metadata with different standards, the difficulty in relaying information between business intermediaries and customer-facing entities will remain while making engagement with the information virtually impossible for creators.⁵³ How can the industry implement uniform data standards in a way that also streamlines royalty distribution, provides more protection for creators, and eradicates unmatched, or unclaimed works? The answer: blockchain, smart contracts, and NFTs.

⁵⁰ *Id.*

⁵¹ *Governance and Bylaws*, *supra* note 6.

⁵² *Frequently Asked Questions*, *supra* note 1.

⁵³ *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]. Creators suffer the most harm under the current system. Streaming services add to this problem by not allowing direct music uploads, requiring creators to engage with distributors to help get their songs heard. *Id.* 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.*

IV. AN UNMATCHED SOLUTION TO THE MUSIC INDUSTRY'S UNMATCHED ROYALTY PROBLEM: HOW BLOCKCHAIN, SMART CONTRACTS, AND NFTS CAN REVOLUTIONIZE ROYALTY REGULATION AND DISTRIBUTION

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 that support the music industry, but the MLC's official website states that it "does not have any current plans to incorporate blockchain technology into its systems."⁵⁴ However, while it is still in its infancy, blockchain, smart contracts, and NFTs can track musical metadata, aiding the MLC in ensuring that creators get paid faster while optimizing data collection through a uniform standard.⁵⁵ A smart digital royalty system would also save the industry time and money by erasing the hours of labor currently spent tackling data discrepancies.

Data errors within the music industry are preventable but much too common. An MLC blockchain

⁵⁴ *Frequently Asked Questions*, *supra* note 1 ("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.").

⁵⁵ *Defining Blockchain and Digital Assets*, DELOITTE, <https://www2.deloitte.com/us/en/pages/about-deloitte/solutions/blockchain-digital-assets-definition.html> [<https://perma.cc/HQ8S-4MGJ>] (last visited Apr. 26, 2023) ("A non-fungible token (NFT) is a unique, cryptographic unit of data that exists on a distributed ledger and cannot be replicated . . . [NFTs] can represent digital media or real-world, tangible items like artwork and real estate, which makes buying, selling, and trading them more efficient while reducing the probability of fraud. NFTs can also represent things like identities, property rights, or even a bundle of rights—all encoded into digital contracts or attestations.").

would ensure musical metadata is tracked in one central place using one uniform metadata standard.⁵⁶ Blockchains are digital distributed ledgers that are transparent, decentralized, and immutable.⁵⁷ Blockchains are decentralized, so instead of storing all the information related to a transfer within one central computer, a blockchain network sends the information to multiple computers across the blockchain.⁵⁸ On a decentralized blockchain, the failure of one computer does not negatively affect the system, because the other computers continue

⁵⁶ This would create uniform standards for inputting data, filing proofs and rollups, and approving validators to ensure accurate, transparent data is being recorded to the blockchain. Sharding addresses scalability issues (with so much data likely to be logged) while decreasing environmental/economic burden on validators because it only requires them to track and maintain certain subsets of the data on the connecting chains, typically the root hash. 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.’”). ZK and optimism 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].

⁵⁷ See Jacob Cass, *10+ Different Types of NFTs—Complete List*, JUST CREATIVE (July 26, 2022), <https://justcreative.com/types-of-nfts/#consortium-blockchains> [https://perma.cc/D39R-ATW3]. Essentially, a blockchain is the digital version of printed transaction receipts. *See id.*

⁵⁸ *What is Decentralization?*, WE TEACH BLOCKCHAIN, <https://weteachblockchain.org/faq/what-is-decentralization/> [https://perma.cc/GTP7-LZKT] (last visited Mar. 24, 2023); see NIAZ CHOWDHURY, INSIDE BLOCKCHAIN, BITCOIN, AND CRYPTOCURRENCIES 13–14 (2020) (“There is no dependency on a single server; hence blockchain does not have a central point of failure.”).

supporting it.⁵⁹ Decentralization ensures that information used to trace transactions can be recovered by another computer on the blockchain if one computer fails.⁶⁰ Blockchains are transparent, because all virtual asset transactions are recorded and accessible to anyone with internet access. Finally, the blockchain record's immutability ensures all on-chain NFTs are accounted for upon transfer.⁶¹

There are private, public, and consortium blockchains; the type of blockchain impacts the three features mentioned above.⁶² Public blockchains come with more security risks because they are truly decentralized so anyone can access them, but private blockchains are not truly decentralized as they are only open to specific individuals vetted by those who run that blockchain.⁶³ Consortium blockchains are the best of both worlds.⁶⁴ They are managed by a limited number of individuals, called validator nodes ("nodes"), but viewable to anyone

⁵⁹ See Jimi S., *Blockchain: What are nodes and masternodes?*, MEDIUM (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].

⁶⁰ See John Evans, *Blockchain Nodes: An In-Depth Guide*, NODES.COM, <https://nodes.com/> [https://perma.cc/RA5Q-74WW] (last visited Mar. 24, 2023).

⁶¹ See CRYPTO DUKEDOM, THE NFT REVOLUTION: MUSIC EDITION 20–21 (2021); see *infra* note 68 (discussing on-chain versus off-chain transactions).

⁶² *Private, public, and consortium blockchains: The differences explained*, COINTELEGRAPH, <https://cointelegraph.com/explained/private-public-and-consortium-blockchains-the-differences-explained/amp> [https://perma.cc/M7XY-RWV6] (last visited Mar. 24, 2023).

⁶³ *Id.*

⁶⁴ *Id.* Access to the blockchain can be as broad or as limited as the validator nodes want. *Id.*

granted access.⁶⁵ A consortium blockchain would allow the MLC and its Committees to oversee creation and operation of the blockchain, while ensuring information could only be added to the chain by private actors who had a copyright interest in the work being logged (i.e., music creators, publishers, record labels, and recording artists).

The main MLC blockchain, alongside four sidechains discussed below, would track a summary of all data from across the music industry and be governed by the MLC and its Committees.⁶⁶ Blockchains often have oracles—entities that transfer real-world data onto the blockchain—and the MLC itself would be the main oracle in this system.⁶⁷ It would screen music-creation entities,

⁶⁵ See Jimi S., *supra* note 59. Validator nodes are authorities on the blockchain that can submit data for consideration to be entered on the chain. *Id.*; see CHOWDHURY, *supra* note 58, at 18 (“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.”).

⁶⁶ See *Governance and Bylaws*, *supra* note 6; see also *supra* notes 8–12 and accompanying text (discussing advisory committees).

⁶⁷ See *What is a blockchain oracle, and how does it work?*, COINTELEGRAPH, <https://cointelegraph.com/blockchain-for-beginners/what-is-a-blockchain-oracle-and-how-does-it-work> [https://perma.cc/D S3Y-XP3N] (last visited Mar. 24, 2023). 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*, BUS. 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 [hereinafter *Proof-of-authority*], <https://cointelegraph.com/blockchain-for-beginners/proof-of-authority-vs-proof-of-stake-key-differences-explained> [https://perma.cc/4BBP-ZU2B] (last visited Mar. 24, 2023) (“The PoA consensus process grants a few . . . players the authority to validate network transactions and update [the

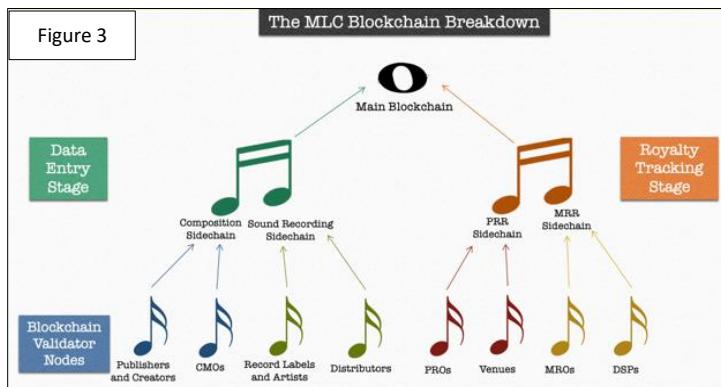
business intermediaries, and customer-facing entities who apply to operate nodes in the system and ensure all parties are using a uniform data standard when relaying information to the main chain.⁶⁸ Additionally, there would be four sidechains: (1) a chain run by publishers, creators, and collective rights organization 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 (“Sound Recording sidechain”); (3) a chain focused on tracking mechanical royalty

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 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>].

⁶⁸ 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/forbes/techcouncil/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 much more secure, but they take up more space on the system, increase the power needed to add a new block to the chain, 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 much less secure. See Amanda J. Sharp, Note, *Head in the BitCloud: A Discussion on the Copyrightability and Ownership Rights in Digital Art and Non-Fungible Tokens*, 59 SAN DIEGO L. REV. 637, 651–52 (2022) (discussing the key differences between these transaction types).

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accumulation (“MRR sidechain”); and (4) a chain focused on tracking public performance royalty accumulation (“PRR sidechain”). Sidechains are compatible independent blockchains that supply information to the main chain, often via rollups.⁶⁹ 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.⁷⁰ The sidechain nodes inputting song ownership data would be run by approved music-creation and business intermediaries, while the sidechain nodes tasked with collection of royalty distribution data would be run by approved business intermediaries and customer-facing nodes.



⁶⁹ See Fuentes, *supra* note 56. Sidechains allow smart contracts to be created within their chain and then deployed and tracked on the main chain by using a universal base layer code. 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].

⁷⁰ See Fuentes, *supra* note 56; Stevens, *supra* note 56.

As Figure 3 shows, each sidechain would play a crucial role in the data tracking and distribution process. The Composition sidechain would ensure that creators and publishers are accounted for and eradicate unclaimed works. The Sound Recording sidechain would ensure that 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.⁷¹

Blockchains eradicate data errors by employing consensus mechanisms.⁷² Consensus mechanisms require at least fifty-one percent of a chain's nodes to validate the information before it can be recorded on the blockchain.⁷³ Within the MLC blockchain, the consensus threshold will incentivize entities to log accurate data. Each of the four

⁷¹ 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 *Proof-of-authority*, *supra* note 67 for a discussion on blockchain consensus methods and Proof of Authority.

⁷² 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. *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>]. Intermediaries are not autonomous or decentralized, so they can easily take advantage of less experienced or novice parties, but smart contracts do not need intermediaries to verify their transactions and are reusable which speeds up the process of logging information in the databases that eventually determine what royalties each party is owed. See *id.*

⁷³ This can work in the reverse via something referred to as a 51% attack. *51% Attack: Definition, Who Is At Risk, Example, and Cost*, INVESTOPEDIA, <https://www.investopedia.com/terms/1/51-attack.asp> [<https://perma.cc/9WUZ-X3E8>] (last visited Apr. 24, 2023) (“Owning 51% of the nodes on the network gives the controlling parties the power to alter the blockchain.”).

sidechains' nodes would then take the information, confirm it is correct by reaching a consensus across the chain, and roll the data up so it can be logged on the main MLC blockchain.

To ensure all parties remain invested in the blockchain's mission and incentivize accurate, timely reporting, the MLC should require business intermediaries and customer-facing entities to stake (i.e., provide for a set time) a portion of their profits on the chain. Staking is like placing money in a high-yield savings account—the staking nodes contribute money to a fund that is used to help run the blockchain and maintain its security.⁷⁴ While staking has traditionally been done to incentivize investment and participation in the block verification process, in the MLC blockchain it would act as both an incentive and deterrent.⁷⁵ The staked profits would be returned to the entities on a rolling basis. Nodes that consistently attempt to log inaccurate data will be warned, suspended, or permanently banned from partaking in future reporting.

Staking helps align the parties' interests by ensuring nodes are rewarded when the system performs successfully and incentivizes all entities to work towards faster, fairer royalty distributions. Additionally, the MLC could ensure music-creation entities participate in good faith by making 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

⁷⁴ 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-JLG P].

⁷⁵ *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> [http s://perma.cc/8RGT-LJ4W] (last visited Mar. 24, 2023).

entities to contribute comprehensive composition and sound recording data on the sidechains or risk losing the chance to dispute inaccuracies later.

Once the initial blockchain is created and the nodes are in place, the actual data collection and royalty distribution should be self-executing.⁷⁶ No additional administrative agency needs to be created to handle disputes arising in connection with this technology as any legal causes of action could be handled under the same resolution avenues available to ordinary legal claims.⁷⁷ In fact, not only could this solution revolutionize the way the United States handles music royalty distribution, but blockchain's digital aspect could eventually allow for global participation in data collection, which could one day lead to the unification of the entire music copyright system. The problems facing the music industry are international, and by implementing blockchain, information can be contributed from international entities, artists would have better global protection against copyright infringement, and fast, fair royalty payments could become a universal reality.

Employing blockchain technology verifies that accurate information is logged in a universally accessible database and creates uniformity by requiring all entities to engage with identical, complete data sets. The blockchain's transparency allows all parties to access real-time royalty information. The MMA laid the groundwork for streamlined royalty regulation and distribution; blockchain can take those ideas and make them tangible solutions.

⁷⁶ See *infra* Section IV.B.

⁷⁷ For example, contract term interpretations, bad actors, copyright infringement, etc.

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B. Consistent, Automatic Royalty Distribution—Smart Contracts

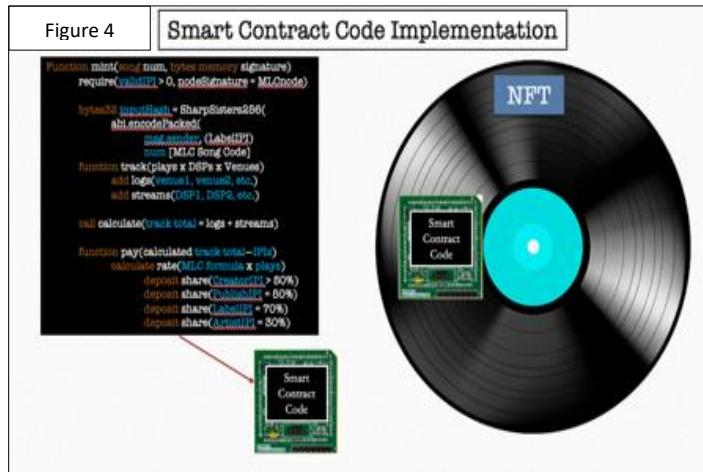
Historically, traditional contracts have solidified the terms negotiated between parties, but they can create discrepancies through nuanced interpretations and data errors.⁷⁸ Traditional contracts also require parties to sign separate documents and pay separate fees to complete a transaction.⁷⁹ Smart contracts can tackle both inaccuracies and inefficiencies. 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.⁸⁰ “Smart contracts are tamper-resistant, self-

⁷⁸ Paul Resnikoff, *Welcome to the ‘Royalty Black Box,’ the Music Industry’s \$2.5 Billion Underground Economy*, DIGITAL MUSIC NEWS (Aug. 3, 2017), <https://www.digitalmusicnews.com/2017/08/03/music-industry-royalty-black-box/> [https://perma.cc/K6CH-3Y9C]. Additionally, most administrative issues occur because humans accidentally misreport or inaccurately input data. The music “royalty black box” is a \$2.5 billion economy where unclaimed, unmatched, delayed, and other types of unpaid streaming royalties live. *Id.*; see also *Unmatched Royalties*, FAIR TRADE MUSIC INT’L, <https://www.fairtrademusicinternational.org/campaigns/unmatched-royalties/> [https://perma.cc/TC4T-83NE] (last visited Mar. 25, 2023).

⁷⁹ See John Ream et al., *Upgrading Blockchains: Smart Contract Use Cases in Industry*, DELOITTE (June 8, 2016), <https://www2.deloitte.com/us/en/insights/focus/signals-for-strategists/using-blockchain-for-smart-contracts.html> [https://perma.cc/MTN5-FBFW].

⁸⁰ *Id.* 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. *Id.* The term smart contract was first coined in 1996 by well-known cryptographer Nick Szabo. Samuel Mbaki Wanjiku, *Nick Szabo—Who Is He and What Is His Influence on Modern Cryptocurrencies?*, CRYPTO.NEWS (Apr. 14, 2022), <https://crypto.news/nick-szabo-who-is-he-and-what-is-his-influence-on-modern-cryptocurrencies/>.

executing, and self-verifying.”⁸¹ They decrease lag time between transactions—as they execute functions instantaneously upon command—and can carry out unlimited functions in one single transaction making separate fees and documents unnecessary.⁸² The automated nature of smart contracts makes them quick, and since they require no intermediaries to execute transactions, they ensure transparency between parties by assuming the burden of transaction validator and executor.⁸³



his-influence-on-modern-cryptocurrencies/ [https://perma.cc/9FMZ-4497].

⁸¹ *Smart Contracts and Financial Services*, *supra* note 72.

⁸² *See id.*

⁸³ *Id.* (“[T]he smart contracts auto-execute [and] . . . validate the outcome instantaneously and without need for a third-party intermediary.”). 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] (last visited Mar. 25, 2023).

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C. **Music Mediums Revisited—CDs to MP3s to NFTs**

To really improve the music royalty system, smart contracts and blockchain technology must work in tandem to provide real-time, accurate royalty distribution. If creators are the most valuable aspects of the music industry, NFTs are their web3 equivalent.⁸⁴ NFTs are unique and cannot be replicated.⁸⁵ While the word token might suggest NFTs are associated with a physical coin, NFTs are simply unique data strings that provide public proof of asset ownership.⁸⁶ Similar to how a barcode on an item of clothing marks the clothing’s price, tracks inventory of that item, and can be referenced to verify that an authentic purchase has occurred, NFTs can track digital

⁸⁴ See generally Matthieu Nadini et al., *Mapping the NFT Revolution: Market Trends, Trade Networks and Visual Features*, 11 SCI. REPS. 9 (2021); see also Aaron Mak, *What Is Web3 and Why Are All the Crypto People Suddenly Talking About It?*, SLATE (Nov. 9, 2021, 5:45 AM), <https://slate.com/technology/2021/11/web3-explained-crypto-nfts-bored-apes.html> [<https://perma.cc/FEL4-36AG>]; see also Moxie Marlinspike, *My First Impressions of Web3*, MOXIE (Jan. 7, 2022), <https://moxie.org/2022/01/07/web3-first-impressions.html> [<https://perma.cc/S9U9-E2PB>]; see also 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>].

⁸⁵ See Jacob Cass, *What is an NFT? Starter Guide for Designers, Artists & Creatives*, JUST CREATIVE (Aug. 25, 2022), <https://justcreative.com/what-is-an-nft/> [<https://perma.cc/GC62-XLCM>].

⁸⁶ See Georgina Adam, *But is it Legal? The Baffling World of NFT Copyright and Ownership Issues*, THE 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 . . .”).

asset ownership and verify a transaction's authenticity.⁸⁷ NFTs are commonly used to track the sale of digital artwork but can be used to track other copyrighted works.⁸⁸

NFTs are the vehicle that will accomplish the MLC's goal of uniform data tracking and streamlined royalty distribution.⁸⁹ When a composition is created, the music-creator entities would enter copyright information into an MLC template that would generate a smart contract programmed to execute that composition's particular royalty distribution functions.⁹⁰ That composition's smart contract would then be (1) recorded on the Composition sidechain; (2) deployed each time a corresponding sound recording is produced; and (3) included in a Composition sidechain roll-up logged on the main blockchain. Then, when a record label records a song using that underlying composition, its sound recording metadata will be automatically matched to the composition smart contract,

⁸⁷ Cass, *supra* note 57.

⁸⁸ See generally Sharp, *supra* note 68, for an in-depth discussion on common NFT uses. ISWC codes, ISRC codes, IPI numbers, Songwriter Split Sheets, etc. are all captured and recorded in the NFT metadata. See *supra* notes 24, 25, 48, and *infra* note 92 for detailed descriptions of each. The smart contracts within the NFTs would track the length of time the song was played, the number of engagements with that song from a particular streaming service during a specific period, etc. The fair-use exception is outside the scope of this paper, but the MLC and its committees would likely create some sort of time limit that would qualify as *de minimis* use. For example, if a song only played for 15 seconds or less, no royalties would accrue, and no customer-facing entities would be charged.

⁸⁹ See Chelsea Cohen, Note, *Welcome to Web 3.0: A Reevaluation of Music Licensing and Consumption to Level the Payment Imbalance for Songwriters*, 45 HASTINGS COMM. & ENT. L.J. 45, 73 (2023).

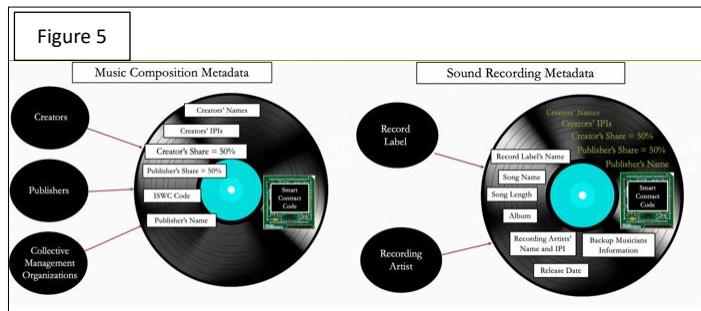
⁹⁰ See David Idokogi, Note, *Decentralizing Creativity: A Tenable Case for Blockchain Adoption in the Entertainment Industry*, 47 RUTGERS COMPUT. & TECH. L.J. 274, 293 (2021) (discussing how a smart contract could calculate and streamline the distribution of fees and royalties owed to all parties).

the sound recording royalty splits will be added to the smart contract, and the completed song would be minted as an NFT on the Sound Recording sidechain and added to the main blockchain. The data logged on the sidechains would be incorporated into the NFT tying the ownership and descriptive metadata back to the creators themselves through unique blockchain aspects like digital addresses and wallets.⁹¹ Incorporating digital addresses and wallets directly into the song’s metadata would allow the artist and creators to be paid simultaneously with the publishers and record labels. Each NFT would also house a smart contract function to track engagement with each song and ensure the royalty allocations were recorded and accessible for future reference.

The smart contract within the NFT could distribute earned royalties automatically and ensure compensation is transferred to the right individuals by matching ownership information with royalty distribution percentages.⁹² Eventually, music catalogs would contain only scannable

⁹¹ Each creator’s IPI number would be linked to a digital wallet and address to streamline royalties. See *infra* note 92 for a discussion on IPI numbers. A digital address is basically a more secure version of a social media username—it links to a user’s transaction history, cryptocurrency balance, and NFT image collection. See Sharp, *supra* note 68, at 640. A digital wallet attaches to a digital address and acts as a storage facility for all NFTs and other digital assets attributed to that address. *Id.*; see also Henrique Centieiro, *All you need to know: NFT Wallets—Custodial vs. Non-Custodial*, LEVEL UP CODING (Sept. 30, 2021), <https://levelup.gitconnected.com/all-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.

⁹² Interested Party Information codes (“IPI number”) are artist-specific tracking numbers 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]



NFTs that link to the sound recording, musical composition, and the royalty allocation splits. Any customer-facing engagement (i.e., playing the song) would trigger the smart contract to record the use, retain the proper funds from the customer-facing party, and distribute the earned royalties to the proper digital wallets linked to the creators via the metadata within the NFT. Embedding smart contracts in the NFTs would eliminate the problems inconsistent data standards create. Linking each song's ownership metadata—regarding what parties owe money and what parties receive money—to a creator's digital address and wallet enables instantaneous royalty distribution. This revolutionizes the royalty distribution process.

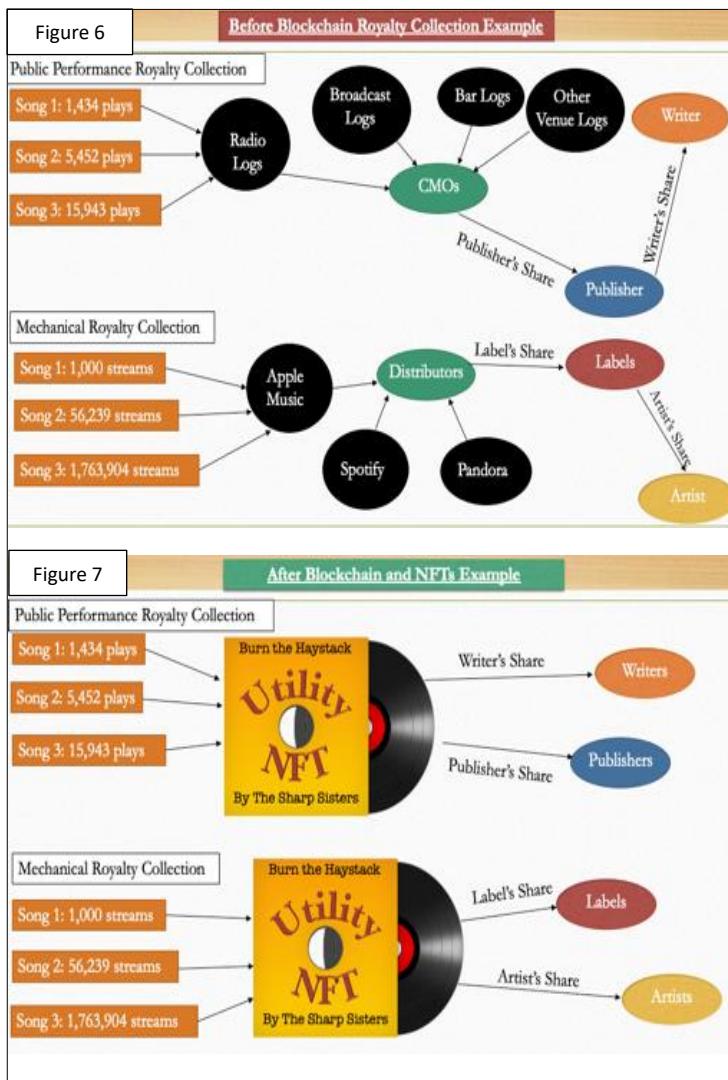
V. CONCLUSION

Despite decades of music digitization, the system is still flawed, suffering from delays, and depriving creators of earned royalties and important recognition. Employing blockchain technology, smart contracts, and NFTs can help

(last visited Mar. 25, 2023). The IPI number could be attached to a creator's digital address or wallet to streamline metaverse and real-world cohesion while also ensuring that the anonymity created via digital addresses does not negatively impact this blockchain. *See supra* note 91 for a discussion on digital addresses and digital wallets.

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the MLC honor its purpose and mend the broken [metadata] record that has plagued an industry dependent on transparency, collaboration, and innovation.



The MLC's blockchain would be a database monitored by music-creation entities, business intermediaries, and customer-facing entities acting as node operators. A uniform data entry process would ensure contributors get credit, while uploading this information to a central blockchain would create a record of each sound recording and musical composition's ownership data. Smart contracts would streamline royalty distribution for creatives, while connecting songs to NFTs would eradicate future unmatched or unclaimed works.

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 that 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.