Music and the blockchain

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Advancing digital technology has created new challenges and opportunities for musicians and the music industry. From the early days of Napster to iTunes to today's latest streaming services, the music industry has managed to adapt around the latest technology to provide new and better ways to consume music. Piracy is controlled, in part, by incentivizing the pay model and by providing a superior music download and streaming user experience. Despite these advancements, music royalty tracking and payment processes have more or less remained the same for decades. Blockchain technology could offer a powerful solution to reinvent the way in which digital music is tracked and royalties are paid.

Tracking digital music rights and royalty payments remains complicated. The existing processes are ripe for positive disruption, and blockchain technology could be the catalyst to improve or reduce existing royalty processes. A brief background on traditional digital rights management (DRM) will help put this in context.

At its core, DRM controls access to a piece of digital content. Currently, the music industry's two most prevalent means of controlling access are contract and technologic encryption. By contract, consumers agree that they will not distribute their purchased content to others. With encryption, the content will only play on certain authorized devices owned or controlled by the owner of the copy.

The drawbacks of traditional DRM systems, however, are myriad and well-documented, with the bottom line being that traditional measures typically fail to prevent the spread of content to unauthorized users. Contracts are ignored; encryption is broken. In an industry where royalties paid to artists are assessed based on the extent to which musical content is distributed and/or performed, traditional DRM falls short both in its efforts to curtail unauthorized use and to provide an accurate system for crediting artists for royalty purposes. Enter blockchain.

Blockchain technology, in its purest sense, is a peer-to-peer distributed ledger technology that uses modern cryptography and network consensus to verify transactions. It offers a more efficient, secure and transparent mechanism for storing, tracking, trading and verifying assets and information — a mechanism that does not rely solely on the involvement of central authorities or other trusted third parties. Individual transactions, such as the transfer of a copy of a music track or a

single stream, could be tracked on the blockchain and recorded in a linear chain (aka the blockchain) of verified transactions that could be traced back to the contributing artists. Verification would be accomplished through the blockchain's unique method of consensus logging: As every user of the blockchain retains his or her own individual copy of the chain, fraudulent alteration of a single record of the blockchain could be detected and rejected as not conforming to the overwhelming majority of blockchain records without the fraudulent record.

Traditionally, one or more artists collaborate to create musical content. The content is distributed by a record company, which would be in charge both of the production and marketing, but also with tracking sales and paying royalties back to the artists. The royalty payment ecosystem is actually much more complicated (seehttp://www.musicrow.com/wp-content/uploads/2010/08/musicreportsroyaltydiagram.jpg), but, for purposes of this article, we have provided a simplified version of the process. In many cases, recordkeeping at each of the record companies, publishers and performing rights organizations (*e.g.*, ASCAP, BMI, SESAC, SoundExchange) creates process inefficiencies and delays in the sharing of information concerning the royalties that are due to rights holders.

The promise of blockchain technology for the music industry is its ability to solve the so-called problem of shared facts and to provide transparency in real time or near-real time. When a piece of musical content is created, all information regarding who created the particular content — including the artists, songwriters, producers, etc., as well as their respective royalty contributions — could be hardcoded into the content file itself as the first piece of ledger information. Because the information is unalterably written into the file and reaffirmed by consensus, any further modifications of the piece, such as if it is used in a remix or sample, will only result in the creation of a new ledger entry evidencing that fact and leaving the original content creation information intact.

As opposed to the traditional distribution scheme, royalty payments to the content creators could also be programmed into the blockchain through the use of a smart contract, which is a self-executing computer program operating on the blockchain, to enforce the performance of contract terms associated with that particular piece of digital content. Smart contracts dedicated to music could enable the artists to automatically and directly receive royalties for every download, share or play of their content or a portion of their contribution.

As an example: Abel records a song written by Brittany, using production funds given by Charlie. During the creation of the song, blockchain information is encoded, wherein Abel will receive 50 percent of all royalty revenue, Brittany will receive 30 percent and Charlie will receive 20 percent. These ratios are embedded within the file through the smart contract, which also requires the exchange of currency in return for access to the file. In a decentralized system, the file is first downloaded by Danny. At the time of transaction, the exchanged currency is automatically transferred to Abel, Brittany and Charlie according to the hardcoded distribution scheme. And, as Danny distributes the file through the peer-to-peer distribution system, each subsequent share continues to transfer funds from the sharers and returns them to Abel, Brittany and Charlie. Through the direct logging of information in real or near-real time, the artists could receive royalties or at least be notified of the royalty trigger, which would then be administered by performing rights organizations. Moreover, because the blockchain is publicly available, the amounts of downloads and plays would be transparent to all involved, preventing obfuscation of numbers and underpayment of royalties.

Further, as each transaction is written to the blockchain, the tracking of each piece of content is more easily accomplished. In our example, as the content passes hands from Danny and is shared to other users, each transaction is hardcoded into the file itself, evidencing a clear chain of transmission. If the file is shared outside of the blockchain exchange, as in an unrelated pirated copy, the enforcement of copyright would allow for the sourcing of the unauthorized file back to its last transaction, providing direct evidence of the last consumer in the chain to have received the file and the likely source of the release of the unauthorized copy.

Several music companies have already begun incorporating blockchain as a core part of their business models. For example, **Ujo** (http://www.ujomusic.com/) is a new shared infrastructure for the creative industries that allows creators and their customers to achieve greater levels of transparency, fairness and profitability. Ujo currently has a prototype on its website illustrating the power of blockchain by demonstrating the policies and royalties attached to a single track of music.**BitTunes'** (http://www.bittunes.org/) platform will allow "music makers" to automatically receive royalties in Bitcoin or other digital currency, whenever and wherever a music sale takes place. BitTunes is currently developing an

application for the Android platform. Lastly, **PeerTracks** (http://www.peertracks.com/) is in the process of building a peer-to-peer network using blockchain that allows for music streaming, retail and even tipping and patronage of particular artists through their network.

Blockchain is continually evolving from its original implementation to support Bitcoin. As the technology becomes better known, we expect more artists to begin adopting blockchain as a means to improve the royalty distribution process and to further control the spread of unauthorized works. By leveraging blockchain technology to further promote transparency and accountability, content producers, content distributors, performing rights organizations and others involved with the music industry could once again benefit from the next advancement in technology.

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