

Blockchain in Media and Entertainment

By Steven Craig Bilow

Most people first encounter blockchain technology by way of cryptocurrencies like Bitcoin. Bitcoin came into existence during the start of the 2008 financial crisis and was first disclosed in October 2008.¹ Because of the timing and some clear indicators embedded into the first (genesis) block of Bitcoin, we know that a primary reason for developing cryptocurrency was a distrust of large institutions that control the world's fiat currencies. However, what does currency have to do with media technology?

Rather than answering that, let's consider the underlying technology from a different perspective. Instead of "currency," let's focus on the word "distrust." Now, we can ask the question: "What does 'trust' have to do with media technology?" Looking back at my years working with media asset management and news workflow, I can confidently say "everything".

Everything from the ownership of an audio asset to the validity of the source of news footage relies on trust. A tamper-evident, cryptographic, decentralized way to ensure authenticity, origin, and ownership, thus, has great value to our industry. Therefore, set aside your Bitcoins and consider ensuring trust. That is what the papers in this issue will do.

Each of the papers we present will discuss the underlying technology in addition to applications. There is some repetition among them already, so I won't exacerbate it by repeating what they will explain. I do, however, think it is useful to describe some basic concepts.

A blockchain is a distributed digital ledger that is very difficult to alter; it's nearly impossible to change a transaction. There is no central repository or authority so trust is handled by the community of users. Every transaction contains a hash value representing all prior transactions. This is not a new concept. I learned to create hash functions as a computer science student in the 1990s. The novelty is in chaining them together *ad infinitum*.

A hash function computes an (almost) unique output of a fixed size for an input of nearly any size. One can

take an input, hash it, and repeatedly recreate the same result. Even a miniscule modification to the input can be detected because the hash value will be totally different. Voila, tamper resistance!

Hashing is but one of the interesting features of blockchain. It's great to know that a transaction between two parties (like a photojournalist and an editor or a content owner and a licensee) is as intended. But how do we, sans centralization, know that the sender and receiver are correct and that a single transaction is only processed once?

Blockchain solves this problem through consensus between users who have no particular reason to trust each other. A node is motivated by something other than the benefit of other nodes or the network as a whole. Generally, this is financial compensation (*laissez-faire* capitalism at its finest). In other scenarios, it may be different and I'll leave it to our authors to provide their perspectives on how.

The NIST overview of blockchain technology² says this: "When a user joins a blockchain network, they agree to the initial state of the system. This is recorded in the only preconfigured block, the genesis block. Every blockchain network has a published genesis block and every block must be added to the blockchain after it, based on the agreed-upon consensus model. Regardless of the model, however, each block must be valid and, thus, can be validated independently by each blockchain network user. By combining the initial state and the ability to verify every block since then, users can independently agree on the current state of the blockchain." Essentially, every block contains all previous blocks and can be independently validated by multiple nodes, so we know that transactions are valid, singular, and secure.

There are many ways that this model can benefit the media industry. For example:

- rights and royalties management;
- reputation management;
- new content monetization models;
- incentivized crowdsourced content distribution;
- content security;
- tracking content through complex workflows;
- verification of authenticity.

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These are some of the applications you'll discover in the papers we've selected.

In *Using Blockchain to Ensure Genuine Media Assets*, Michael Barroco discusses the notion of Smart Contracts and explores ways to ensure asset traceability. He examines how a distributed ledger can track an asset from capture, through editing, to publication. Barroco proposes a design that anonymously guarantees asset integrity, chronology, and source validation through the workflow.

Stephan Schneider presents a tutorial entitled: *Metadata and Rights Management for Media Assets Using Blockchain Technology*. It begins with a discussion of blockchain and its consensus mechanism and goes on to explore a two-step content management process. Step one is an identification and authentication system, which he says "allows us to identify a piece of content and assign it to a natural person or legal entity." Step two implements smart contracts to actually add contractual data to the content itself, thus allowing the granting of rights to other entities. All this is based on the Ethereum blockchain.

Finally, "*Using Blockchain to Manage Production Distribution*" by Eric Minoli discusses a role for Blockchain in contributor compensation by media production businesses. He reminds us that "...writers, director, actors, musicians, and more all have to be paid". The paper

details "a prototype platform, which uses blockchain to create a completely fresh approach to managing" the myriad relationships between broadcasters, OTT providers, distributors, other suppliers and the individuals and entities who need to be compensated.

We hope you enjoy this unique and hopefully enlightening issue.

References


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2. D. Yaga, P. Mell, N. Roby, and K. Scarfone, "Blockchain Technology Overview," NIST. [Online]. Available: <https://nvlpubs.nist.gov/nistpubs/ir/2018/NIST.IR.8202.pdf>

About the Author



Steven Craig Bilow has over 30 years of experience in broadcast news, media asset management, control room design, and education. He first published in the SMPTE Journal in 2001 and is a member of the Board of Editors. Bilow is a member of SMPTE and a senior member of the Association for Computing Machinery (ACM), where he serves on several USACM committees. He is currently the product marketing manager with BlueVolt.

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