

Blockchain and patents

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Blockchain is a comparatively new internet-based and cloud-based protocol and architecture that is receiving a lot of notoriety. Probably the best-known use of blockchain today is with cryptocurrencies, such as bitcoin, which are digital assets that use cryptography to secure and validate transactions.

There are many patent-related opportunities associated with blockchain technology. Before discussing the patent implications, however, it is important to understand the basic features and technology of blockchain-based systems.

BLOCKCHAIN FEATURES AND TECHNOLOGIES

Blockchain is characterizable as a peer-to-peer protocol for data storage where select portions of the stored data can be publicly accessible, other data can remain private, data are stored in an extendible chain in a distributed fashion, and data storage is not under the control of a single player such as a particular third party.

The blockchain protocol rides on top of internet protocol, allowing blockchain functions to be readily integrated into internet applications.

Also, blockchain uses a fault-tolerant approach to mitigating failures caused by corrupted or improperly changed data.

By shifting how data are captured and stored, blockchain affords a potentially game-changing opportunity that can disrupt numerous industries and business methods — from traditional government services, like identity validation or real estate recordings, to functions such as the generation and use of concert and sporting event tickets.

Business activities, such as financial transactions or the sale and distribution of foods, often include a sequence of events.

In blockchain, data elements depicting an action or transaction are stored in “blocks” combined in an ongoing and growing chain, such as a block in a chain or sequence of financial transactions. For example, consider a painting owned by A, who sells it to B, who later sells it to C.

Each of these transactions is a block in a chain; each block contains important information about that sale; and each sale is linked to

the previous one, thereby creating a chain of title. Each sale grows the chain.

In simple blockchain applications, each block is potentially redundantly and permanently stored in multiple locations in a cloud environment, where each storage site is potentially independent of all others, thereby providing great assurance of later access to the data.

Even if one storage site becomes corrupted or unavailable, others retain the data. In other words, at least in part because of redundancy and distributed storage, data security should be improved.

Probably the best-known use of blockchain today is with cryptocurrencies, such as bitcoin.

The integrity of the distributed stored data is validated by multiple members of the peer-to-peer network. Thus, no independent or “trusted” third party — like a governmental agency — is needed for validation and assurance.

Because of the importance in validating and tracking transactions relative to currencies, in at least some cryptocurrency applications, an incentive — in the form of cryptocurrency payment — to validate new data blocks is provided, at least in part, to speed up recordation of transactions.

This validation is called “mining.” Once validated, the new block is stored. This overall approach potentially improves the integrity of stored data over current methods and approaches.

Blockchain also can be used as a way to establish a virtual permanent ledger. Whereas ledgers are generally thought of as accounting records, such as spreadsheet software, blockchain ledgers can be used for a variety of purposes for tracking data and associated transactions.

The blockchain ledger grows with each transaction with a new block, known as a child, referencing the previous transaction in the chain, the parent. By doing so, the parent remains unchanged but the chain is “added to” when the child block is created.

Though the chain itself is transparent, each entry may include aspects making certain content, such as the identity of the owner, hidden within the chain.

The blockchain ledger is “virtual,” meaning it does not generally exist as a single spreadsheet or a single piece of paper. Instead, it can be recreated, in whole or in part, based on demand.

And, in part because of the distributed storage, the records in the chain become permanent and generally irrevocable or irreversible, even though they may not exist as a single file.

For example, in a cryptocurrency system, the ledger of blockchain is helpful in both validating the chain of title of a currency and providing assurance of its uniqueness. This is an assurance that the coin or transaction has not been duplicated so as to provide confidence as to the coin’s authenticity and value.

Blockchain also has applicability in the gaming industry, where some early players accepted bitcoin for online betting.

Blockchain further affords cryptocurrencies with a ledger-based approach to subdivide currency, such as a holder selling only a portion of the holdings.

Blockchain has not gone unnoticed in financial services. According to one report, there are over 120 hedge funds already playing in the virtual currency space.¹

This distributed, secure ledger has applicability across many other industries and traditional governmental services as well.

For example, the state of Illinois is investigating the use of blockchain to manage its residents’ personal histories, including tax, voting and driver’s license data.²

Under the contemplated approach, residents would own their data but at least some of it could be shared on an as-needed basis by providers of governmental services.

In another example, Canada and the Netherlands are working on a blockchain approach to a “Traveler ID.”³

And the National Energy Commission of Chile announced that it will use a blockchain platform to authenticate pricing and legal compliance.⁴

Recognizing the potential importance of blockchain, one can just imagine the varying ways these chains can be used. The chains could be used to avoid “go-betweens” to act as a trusted intermediary, for instance.

Traditional banks and other financial institutions, among others, are attempting to mitigate perceived emerging business risks by seeking patent protection for blockchain approaches to their businesses.

Patent applicants thus far include companies big and small, such as banks, financial service companies, telecom companies and major internet companies, as well as companies in many other industries involving online transactions.

Similarly, the secure data chain blockchain provides can be a boon to those seeking to authenticate or validate ownership of virtual or real goods.

Unlike a tangible metal or paper currency that is backed by a government, cryptocurrencies are virtual. Therefore, validating their authenticity is key to ensuring their value.

Assuming elements of a block encompass ownership information, the chain can be used to validate a description of a property and its chain of title. This approach may become a key to validating digital rights management.

In a way that is similar to the early days of the internet or TCP/IP, blockchain adoption is growing and evolving rapidly because it has high potential to cause huge changes to how many industries do business.

Due to its potentially far-reaching impact, we are already seeing a gold rush in investment relative to blockchain — for example, the rise and fall of bitcoin — by business speculators. This investment includes patent investment.

BLOCKCHAIN AS A PATENTABLE TECHNOLOGY

To be eligible for patent protection, an invention must be novel, useful and not obvious over prior inventions.

According to the National Law Review, by mid-January 2018 more than 60 U.S. patents related to blockchain technologies had been issued. In addition, more than 500 applications had been filed.⁵

The fundamental concept of blockchain was patented more than 20 years ago, and that technology is no longer under patent protection in the United States.⁶

Since the concept is both protocol-based and potentially architecturally based, however, add-ons to the protocol or to the functionality running in software, and new architectures and the technology platforms being implemented, are potentially patentable areas.

Evolutionary aspects to elements of core blockchain technologies that could lend themselves to patentability include aspects of transaction protocols, security and data analysis.

One way in which blockchain is implemented relative to distributed computing and storage is with data validation and mining, during which many computing platforms race to identify and store newly formed blocks.

New approaches to data validation and mining are potentially patentable. Such approaches could include novel searching techniques that produce faster transaction recording times.

All these types of inventions are forms of, or relate to, algorithms or algorithmic implementations.

To patent them, they must comply with the statutory patentability criteria as well as recent case law limiting the patentability of these types of inventions.

The Supreme Court's landmark decision in *Alice Corp. Pty. Ltd. v. CLS Bank International*, 134 S. Ct. 2347 (2014), and its progeny preclude patentability of mere abstract ideas and mental processes, and limit the scope of business method and related claims to those having "significantly more" than a mere abstract idea.

Some cases, such as *Bascom Global Internet Services Inc. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016), provide guidance as to when a novel method or architecture includes the requisite "significantly more."

These later cases provide some guidance as to when something meets the "significantly more" test.

Improvements to the basic protocol are also patentable if they meet the same patentability criteria, including being "significantly more" than the underlying idea.

Such improvements may, for example, include significant add-ons to the protocol, improvement in security, improvements in configuring a ledger, improvements to data mining or improvements in adding to a chain.

While on the surface blockchain has the potential to be more secure than prior approaches, it is not foolproof. For example, Apple co-founder Steve Wozniak reported that he had bitcoins stolen from him through a fraudulent transaction.⁷

Systems for overcoming such security issues may be patentable.

Some blockchain-related patents relate to specific uses of the basic blockchain protocol. These patents include:

- U.S. Patent No. 9,635,000, which covers aspects of identity management based on peer-to-peer protocols and a public ledger.
- U.S. Patent No. 9,842,216, issued to NewVoiceMedia Ltd. in December 2017, which covers tamper-proof timestamps in a blockchain.

- U.S. Patent No. 9,830,593, which was issued to SS8 Networks Inc. in November 2017, and covers methods for identifying users in pseudonymous transactions.

While security improvements are a part of the core technology, patents such as U.S. Patent 9,807,106, issued to British Telecommunications PLC in October 2017, have been granted for security-related attributes directed to mitigating a blockchain attack.

Importantly, these examples represent a diversity of industries, indicating that blockchain work is widespread today.

PATENTABILITY OF BLOCKCHAIN APPLICATIONS

Because blockchain is a protocol running on a distributed architecture, it can also be used as a platform for advanced applications that are similar to advanced applications on the internet. Aspects of these applications, or the applications running on the platform themselves, can be subjects of patent applications.

Of course, the best-known application is for cryptocurrencies, and, not surprisingly, several cryptocurrency patents have already been issued.

Banks, trading exchanges and companies involved in transaction processing are already major players in applying for and being granted patents.

Application-based blockchain patents include U.S. Patent No. 9,870,508, issued to Unveiled Labs Inc. in January 2018, directed to methods and systems for authentication, at least in part, in cryptocurrency applications in blockchain networks.

Again, because blockchain serves as a protocol, other technologies can be layered on top of it.

U.S. Patent No. 9,849,364, issued to Bao Tran in December 2017, is another example. That patent relates to using sensor data collected by an "internet of things" device that stores data on a blockchain for later use.

Topical areas using blockchain technologies also go beyond financial transactions.

One example is U.S. Patent No. 9,792,742, issued to Live Nation Entertainment Inc. in October 2017, which provides venue access control based on a blockchain or bitcoin chain of title.

Because of the virtual ledger and ability to track chain of title, blockchain is quite applicable to supply chain management as well. This supply chain management includes traceability.

Several patents relating to supply chain management traceability using cryptographic ledgers have issued in this space, including two issued in May 2017 to SkuChain Inc.

Blockchain also has applicability in the gaming industry, where some early players accepted bitcoin for online betting. Increments in management of health and health records using the linkage ability of blockchain were also patented.

U.S. Patent No. 9,665,734, issued to Q Bio Inc. in May 2017, is directed to a method for performing record substitution applicable to blockchain technology.

In all these cases, in part due to the limitations set by *Alice* and its progeny, claim coverage tends to be somewhat limited.

However, in at least some circumstances, the existence of a patent provides credibility and an asset that can be used for other purposes.

Blockchain patents as a commodity

Companies are already being formed to leverage blockchain-based patents for various purposes.

As an example, IPwe has established itself as a worldwide registry for blockchain-based patents. Its registry is a one-stop shop for determining who has ownership of the asset.⁸

IPwe notes that it expects to use its registry to store patent transactions and to validate chains of title.

It also established a blockchain-enabled database and uses artificial intelligence and predictive analytics as tools to improve patent applications in advance and to determine their worth.⁹

Blockchain patents as a revenue product

Much of blockchain's use is theoretical, since many possible applications have not yet been deployed.

A group of users who will accept the requisite distributed storage for a blockchain application needs to be established, because a patent may impact many future users.

Consequently, anticipatory filers of patents can be or can become non-practicing entities, particularly when the market is more favorable to them.

For example, if an application is denied the applicant may turn to selling the technology or enforcing other patents they hold.

As an example, there has been an apparent uptick in enforcement actions stemming from the surge in pricing for bitcoin.¹⁰

Blockchain as a means of patent validation

A blockchain's stable history itself is a useful asset to validate intellectual property. It is already being used in limited ways for copyright digital rights management.¹¹

Once an authorized version of an item, such as a recording or a bitcoin, enters the chain, blockchain could use mining techniques to allow a party to determine whether a later use is authorized and take appropriate action.

Similarly, one can determine whether a patent is valid relative to prior art.

Using sophisticated analytics, it is possible to apply blockchain technology in determining novelty. Such a use might be beneficial when determining if one wishes to license or purchase a patent asset.

Similarly, the approach may help patent examiners or potential applicants in determining cost effectiveness in filing well before a patent is challenged.

Commercializing blockchain patents

The development of blockchain IP is in its early stages, but patents in this space already have been sold.

Marathon Patent Group, a publicly traded company that has a history of acquiring patents, announced an acquisition of cryptocurrency-based transmission patents.¹²

Blockchain, as a combined protocol and architecture, has the potential to transform the internet.

Both private companies and governments are using the potential benefits of blockchain technology to improve service or, in at least some cases, create new services. Consequently, patents and patent-related activities have already begun to take hold.

Numerous companies and individuals, across many industries, are players in the blockchain patent world, either to capture patent rights or to use the patent world for positioning.

NOTES

¹ Evelyn Cheng, *There Are Now More Than 120 Hedge Funds Focused Solely on Bitcoin*, Digital Currencies, CNBC (Oct. 27, 2017), <https://cnb.cx/2lmxrkp>.

² Wolfie Zhao, *Illinois Eyes Blockchain for IDs and Public Asset Management*, COINDESK (Feb. 1, 2018), <https://bit.ly/2BNfFts>.

³ Jeremy Nation, *Canada and Netherlands Pilot Airline Passenger Biometric Identity Solution with Blockchain Technology*, ETHNEWS (Jan. 29, 2018), <https://bit.ly/2JWmFbV>.

⁴ Pilar Sánchez Molina, *Chile's Energy Regulator to Use Blockchain*, PV MAGAZINE (Feb. 27, 2018), <https://bit.ly/2oDWEn>.

⁵ James G. Gatto, *Patent Strategies for Cryptocurrencies and Blockchain Technology*, NAT'L L. REV. (Jan. 17, 2018), <https://bit.ly/2K0FURG>.

⁶ U.S. Patent No. 4,309,569 (issued Jan. 5, 1982).

⁷ Evelyn Cheng, *Steve Wozniak Says Someone Stole Seven Bitcoins from Him*, CNBC (Feb. 26, 2018), <https://cnb.cx/2EUxVY6>.

⁸ IPwe, <https://ipwe.com>; Eric Rosenbaum, *Buying Bitcoin Led Patent Mega-Millionaire to an Even Bigger Investing Idea*, CNBC (Jan. 12, 2018), <https://cnb.cx/2D73oFQ>.

⁹ Erich Spangenberg, *The Power of Blockchain and Divorce — How We Got to IPwe*, IPWATCHDOG (Nov. 27, 2017), <https://bit.ly/2l1ap9m>.

¹⁰ See, e.g., Saheli Roy Choudhury, *After Bitcoin's Dramatic Rise, Here's Where Experts See Cryptocurrencies Heading*, CNBC (Dec. 7, 2017), <https://cnb.cx/2iDojUf>.

¹¹ Tyler Harttraft & Roberta Jacobs-Meadway, *Where Does Blockchain Fit in Digital Rights Management?*, IPWATCHDOG (Feb. 6, 2018), <https://bit.ly/2KHKg16>.

¹² Press Release, Marathon Patent Group, *Marathon Patent Group Acquires Blockchain and Cryptocurrency Transmission Patents* (Jan. 18, 2018), <https://bit.ly/2rpchT5>.

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