

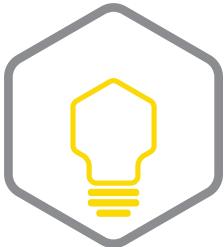
# PATENTS AND BLOCKCHAIN INNOVATION

## Strategic Approaches to Intellectual Property

Thomas M. Isaacson  
Polsinelli PC

January 2018





## Realizing the new promise of the digital economy

In 1994, Don Tapscott coined the phrase, “the digital economy,” with his book of that title. It discussed how the Web and the Internet of information would bring important changes in business and society. Today the Internet of value creates profound new possibilities.

In 2017, Don and Alex Tapscott launched the Blockchain Research Institute to help realize the new promise of the digital economy. We research the strategic implications of blockchain technology and produce practical insights to contribute global blockchain knowledge and help our members navigate this revolution.

Our findings, conclusions, and recommendations are initially proprietary to our members and ultimately released to the public in support of our mission. To find out more, please visit [www.blockchainresearchinstitute.org](http://www.blockchainresearchinstitute.org).



**Blockchain Research Institute, 2018**

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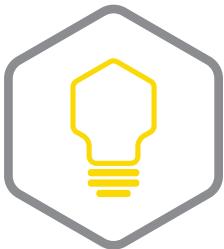
Thomas M. Isaacson, "Patents and Blockchain Innovation: Strategic Approaches to Intellectual Property," foreword by Don Tapscott, Blockchain Research Institute, 29 Jan. 2018.

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## Foreword

Blockchain technology moves quickly—sometimes too quickly for the law to keep up. We expect innovation beyond fintech in such areas as medical research, where security, privacy, and veracity are paramount. Patents give their inventors exclusive rights to their intellectual property, but ought to do so in a manner that neither stifles innovation nor shores up monopoly power.

I enjoyed how Tom Isaacson, the head of this research project, compared the landscape of blockchain patents to the Oklahoma land grab in the nineteenth century. We stand on a frontier, where people have a great opportunity to stake their claim. There are those motivated solely by greed or malice who could spoil the territory for everyone. There are more than a few inventors within the blockchain community who would avoid patenting altogether. This project sizes up the situation, identifies key early decisions, and identifies which companies, regions, and industries are actively pursuing blockchain patents. (I also enjoyed his analysis of whether the most active patent seeker is, in fact, Satoshi Nakamoto.)

We wanted this research to be both precise and forward-thinking. It required an author who was well versed in technology law and could predict how blockchain would challenge and transform legal systems. The latter goal was difficult since, by its very nature, distributed ledgers operate across multiple legal jurisdictions. The Blockchain Research Institute was fortunate to connect with Tom, and his work has exceeded BRI expectations. Tom brought Marc Kaufman's expertise to the project, evidenced by the rich charts throughout.

Our production team added a rich selection of patent drawings, each well over a century old. I am struck by their artistry—perhaps art and science were more integrated back then? Each communicates on its own about its place in time, the state of science, and the realities of life. I wonder—what will blockchain patents say about us, about our time, our concerns, and our dreams for the future?

This project has greatly informed my thinking on blockchain patent strategy: cooperation early on can pay off for everyone later on. That's the promise of distributed ledger technology.



DON TAPSCOTT

*Co-Founder and Executive Chairman  
Blockchain Research Institute*



## Idea in brief

*A patent must meet three baseline criteria to be granted: the invention must be eligible, new or novel, and non-obvious.*

- » A large amount of investment funding is flowing into the blockchain space for innovations in precision medicine, financial transactions, energy waste reduction, digital rights management, and other contexts. Companies have an interest in staking claims to their inventions by filing patent applications. It could become a “land grab” for intellectual property. We provide an overview of patent filings to date, broken down by company, country, and area of technology.
- » This research examines the basics of patent law and its application to blockchain technologies. Recent Supreme Court and Federal Circuit case law has introduced a legal climate that can make patenting certain blockchain technologies challenging. The applicant strategies observed so far have yielded mixed results.
- » Patent applications can be filed for a number of reasons: *offensively* (as an attempt to make money from the patent), *defensively* (as an attempt not to be prohibited from using the technology), and *communally* (in cooperation with other companies in the sector, making the technology available among a wider group).
- » A patent must meet three baseline criteria to be granted: the invention must be eligible, new or novel, and non-obvious. In some cases, patents for blockchain-related technology might stumble in meeting these criteria, particularly the second and third points.
- » The research surfaced three strategies for avoiding a blockchain patent “land grab”: forming patent pools, constructing a blockchain for blockchain patents, and taking a communal approach.
- » The author discusses the benefits and the drawbacks of voluntary communal coordination and provides recommendations for future innovation and regulation so that the community can access foundational or essential blockchain patents while the inventors and those who invested in the essential patents receive fair compensation.



## The land grab and the blockchain frontier

On 3 March 1889, US President Benjamin Harrison announced that a 1.9 million-acre tract of Indian Territory would be opening for settlement at high noon on April 22.<sup>1</sup> Anyone wanting to participate had only seven weeks to prepare.

By 11:50 A.M. on 22 April 1889, some fifty thousand settlers had lined up along the western border of the United States of America at Fort Reno. Soldiers watched those gathered at the border to make sure nobody jumped the gun.

As the clock struck noon, a canon boomed from Fort Reno, signaling the start. The fifty thousand rushed into the open territory. By nightfall, they had staked thousands of claims for land. Towns like Norman, Oklahoma City, Kingfisher, and Guthrie formed on paper overnight. The land grab demonstrated the extraordinary pioneering spirit and American lust for ownership. Getting the best plot of land did not matter. What mattered was taking the risk, seizing the opportunity, and watching out for fraud.

The Oklahoma land rush is an apt analogy for the haste in claiming patents for blockchain technologies. Introduced conceptually in 2008 and implemented in 2009 as the core component of a new currency called *bitcoin*, the Bitcoin blockchain has become the most valuable public ledger for bitcoin transactions.

Using the blockchain solves previous problems related to currency. Verifying transactions with the blockchain can confirm that each unit of digital cash is spent only once, solving a long-standing “double spend” problem. The blockchain can assign title rights because it provides a record that compels offer and acceptance. From a technical viewpoint, a blockchain is a hash chain inside another hash chain.

After the release of the Bitcoin blockchain protocols as open-source code, innovators realized they could use this new technology as a foundation for other inventions. Many other digital cryptocurrencies burst onto the scene—ether, litecoin, peercoin, primecoin, namecoin, and ripple, to name a few.

Blockchain technology is unique and groundbreaking in that it provides a trustless distributed database: records transacted between two parties do not require any degree of trust between the actual parties to guarantee the veracity of the records. The iterative hashing along the chain protects against *post hoc* alterations, and consensus algorithms guarantee the veracity of the branch of the chain under consideration. There is currently a large amount of investment and innovation flowing into blockchain technologies.

*The Oklahoma land rush is an apt analogy for the haste in claiming patents for blockchain technologies.*



*The cannon has already boomed, and blockchain settlers have begun staking their claims to intellectual property.*

In light of the massive developments related to blockchain technology across multiple domains, some corporate executives are uneasy about patent protection for blockchain technologies. The cannon has already boomed, and blockchain settlers have begun staking their claims to intellectual property. At least some assertion letters have been sent to corporations asking for licensing royalties.

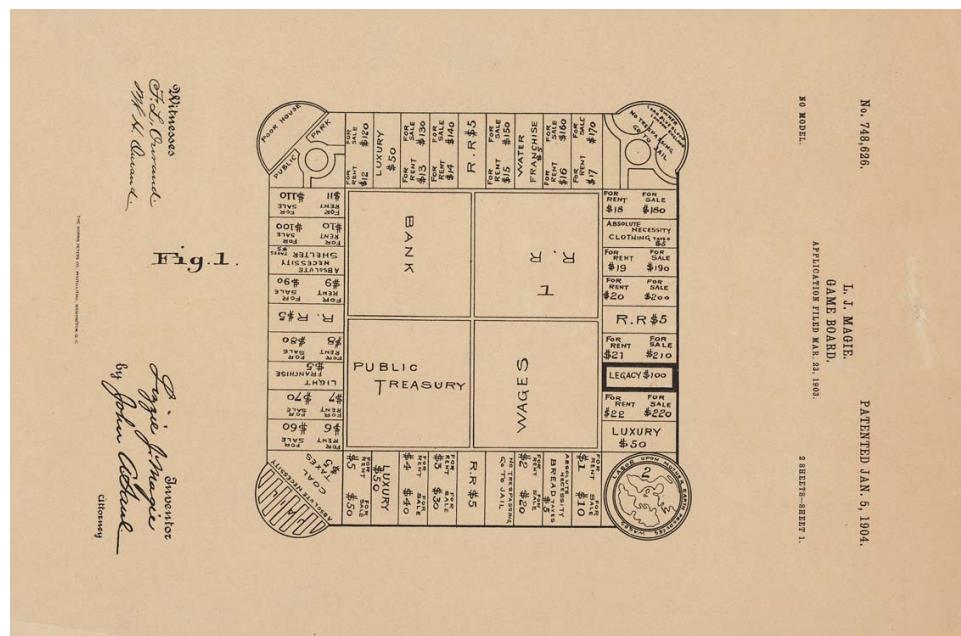
In some cases, whether a respective patent is valuable is a separate question. Any entity, self-funded or funded by investors, has an interest in protecting its intellectual property and directly benefitting from it. As Rosario Ingargiola, CEO of the peer-to-peer trading network OTCXN, put it, “[Those with] an investor would be quite remiss to take the position that they’re going to take their intellectual property and just donate it for the public good.”<sup>2</sup>

Other leaders, such as Jonathan Johnson, a board member of Overstock.com and president of Medici Ventures (an entity that is developing blockchain technologies through a number of companies), utilize a defensive strategy in which innovations are patented to protect against trolls. Johnson noted that some developers take a libertarian position against patenting anything in the blockchain space. After all, Satoshi Nakamoto released the Bitcoin blockchain code as open-source. However, for any company trying to create wealth, Johnson said, “Patents are helpful.”<sup>3</sup>

The current state of the field is that many companies are wondering what kind of space there might be in blockchain technologies for patenting their innovations, and if so, how to proceed. While most companies are implementing a patent strategy for defensive purposes, some patent owners are also starting to send licensing letters on allegedly basic blockchain patents.

*[Those with] an investor would be quite remiss to take the position that they’re going to take their intellectual property and just donate it for the public good.”*

 ROSARIO INGARGIOLA  
Chief Executive Officer  
OTCXN



File unit no. 748626, Lizzie J. Magie, "Drawing for a Game Board," 5 Jan. 1904; Selected Patent Files, 1840–2005; Record Group 241: Records of the Patent and Trademark Office, 1836–1978 (National Archives Identifier: 595519); National Archives at College Park, MD. No known copyright restrictions.

## Observed strategies and the field at large

*In general, blockchain patents face a more perilous path to grant than other technologies.*

Where technology moves at a breakneck pace, the world of patents moves at a glacial one. Some of the earliest blockchain technology applications have only recently completed prosecution and received a grant. Many more are plodding along through the sometimes-Sisyphean process of patent prosecution.

We can, however, observe early trends in both patents that have issued and the application portfolios of companies seeking grants. Some leaders, including those interviewed for this project, are primarily defensive patent seekers, who want “to get … patents so no one could use them against [them].”<sup>4</sup>

Business leaders like Ingargiola of OTCXN see patents as a means of ensuring that “the way [they] do something, [they] absolutely want to protect and benefit from.” Both of these approaches have benefit and value for the larger community and both are vulnerable to another settler on this new frontier, the applicant seeking as much territory as possible simply to engage in rent rather than push development forward.

In general, blockchain patents also face a more perilous path to grant than other technologies. The mathematical and logical underpinnings of the blockchain are so tightly wrapped around the technology that distinguishing the patentable material from other software-implemented technologies is difficult.

### Baseline patentability

With patents, not all technologies are equal under current law. Ultimately, a patent application must meet three core criteria to receive a grant:

- » The invention must be *eligible*.
- » The invention must be *new or novel*.
- » The invention must be *non-obvious*.

In simple terms, we cannot patent a universal truth or scientific observation like gravity, we cannot patent something already invented like penicillin, and we cannot patent something obvious—though the question of obviousness is rich and deep. To obtain a patent in the United States, we must at least address each of these three statutory requirements.<sup>5</sup> The first criterion gets to whether anything in the field can be patented, but the latter two will be equally concerning later, where potential prophylactics against a land grab are discussed.

Any blockchain-based technology (used to create, for example, a “useful process”) would be patent-eligible, right? The answer is not clear-cut. While software remains unquestionably patentable,



we cannot ignore challenges with the current state of the law. The intense interest in the blockchain has led to many publications that outline business models based on the blockchain. For example, *Blockchain Revolution* by Don Tapscott and Alex Tapscott sets forth many business models based on the blockchain.<sup>6</sup>

*An innovator must apply the blockchain in such a way that current business models could not because of their intrinsic limitations.*

Innovators likely could not obtain patent claims as broad as simply using the blockchain to apply to an existing business model, such as a general real-estate transaction. Rather, an innovator must apply the blockchain in such a way that current business models could not because of their intrinsic limitations. The innovation must be novel over prior approaches to pass 35 USC § 102 (which is shorthand for US Code Title 35, Section 102).

Next, 35 USC § 103 requires that the differences between the claimed invention and prior art not obvious in view of prior art.<sup>7</sup> Patent attorneys often make their living off this section. Frequently, the US Patent and Trademark Office (USPTO) rejects a claimed invention in view of two or more prior art references.

For example, if a person files a patent application generally claiming blockchain technology to record real-estate deeds, the patent examiner could cite one prior art reference disclosing basic blockchain technology and then simply cite another reference describing real-estate deeds and the recording process. The examiner could then conclude that the combination would have been obvious to someone of ordinary skill in the art.



Exhibit no. 554.0011; "Still Design Patent," 1808; Restored Patent Drawings, compiled 1837-1847, documenting the period 1791-1836; Record Group 241: Records of the Patent and Trademark Office, 1836-1978 (National Archives Identifier: 568); Cartographic and Architectural Records Section, National Archives at College Park, MD. No known copyright restrictions.



## Alice issues

The Supreme Court's 2014 decision in the Alice Corporation's suit against CLS Bank International caused a serious ripple throughout the patent community, and in particular, patents and patent applications related to software and financial inventions, by defining certain software inventions as "abstract ideas."<sup>8</sup> The effect of this decision expanded the potential scope of inventions that could be declared patent ineligible under 35 USC § 101.<sup>9</sup>

The actual language of section 101 is quite broad. However, how the Supreme Court in *Alice* applied this section resulted in the rejection of patent claims focused on a process for mitigating settlement risk because they were "abstract ideas." These are not normal abstract ideas. The concept of the color blue is abstract: it exists only in thought, not in tangible form. The Supreme Court's ruling set forth a complicated analysis for determining whether and when software—which has no concrete existence—is practical enough to be eligible for a patent.

The analytical process the court applied is as follows. First, the court determined that the concept of intermediated settlement is a "fundamental economic practice long prevalent in our system of commerce" and represented a "building block of the modern economy."<sup>10</sup>

After determining that the claims generally were directed to a concept defined as an abstract idea, the Supreme Court asked whether other claim limitations transform the abstract idea (of intermediated settlement) into a patent-eligible invention. Adding conventional steps at a high level of generality, and introducing a generic computer into the claims, did not render the claims substantial enough to be patent-eligible. In other words, even if the claims recited hardware like a processor or a computer that performed operations as instructed by software, the claims could still be considered to be "abstract" and not patent-eligible under certain circumstances.

*The overall thrust of the decision in the Alice case is that the courts do not favor existing business practices being implemented on generic computers.*

The overall thrust of the decision in the *Alice* case is that the courts do not favor existing business practices being implemented on generic computers. The Supreme Court in its reasoning cited a nineteenth-century textbook that discussed mitigating "settlement risk." The court felt that the claims did not include an "inventive concept."<sup>11</sup> Because the analysis was under 35 USC § 101, the court never got to the questions of whether the claims were novel or non-obvious under 35 USC § 102 or § 103.<sup>12</sup>

Following the *Alice* decision, the USPTO trained patent examiners on the principles in that decision. As pending applications were examined under the new guidelines, the number of rejected applications increased in the Patent Technology Center 3600 BM (business methods) and particularly workgroup 3690 (finance and banking, accounting). Never had a court case initiated such a dramatic shift at the patent office. It did not appear that the law



*This is of great concern to companies filing patent applications on financial innovation, but companies are still filing applications.*

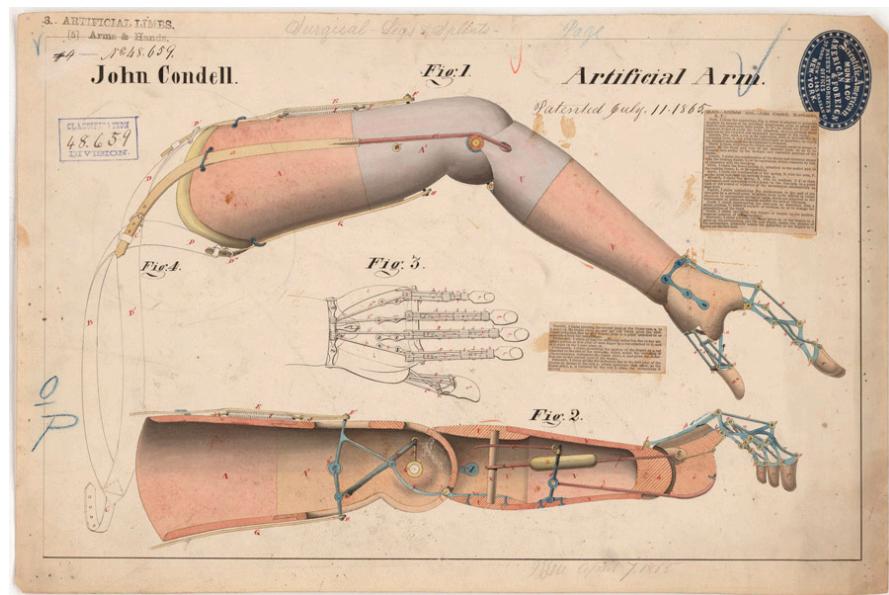
dramatically changed in the *Alice* decision relative to prior decisions, such as *Bilski v. Kappos*.<sup>13</sup>

While some other working groups at the patent office experienced a drop in allowances, none saw the dramatic changes after the *Alice* decision as extensively as Technology Center 3600 BM. This is not to say that no financial patents are getting through—some are—but the overall numbers are way down.<sup>14</sup> This is of great concern to companies filing patent applications on financial innovation, but companies are still filing applications.

## Strategies and case studies

What patent portfolios are companies obtaining? Let's look at Coinbase, which integrates multiple domains and represents a relatively stable anchor point in the emerging markets and communities. Coinbase is a digital currency-exchange platform that facilitates "buying, selling, transferring, and storing digital currency."<sup>15</sup> Coinbase provides a variety of services and utilities, including wallets, exchanges, payment processing, and its global digital asset exchange (GDAX).<sup>16</sup> The company engages with bitcoin, bitcoin cash, ether, and litecoin, as well as offering an *application programming interface* (API) suite for developers.

Coinbase's patent portfolio contains twelve patent applications with ten members in the same family, covering the core of Coinbase's business. The claims range from bitcoin exchanges to exchange techniques, and from storage to verification of "off-blockchain transactions." The applications focus on wallet innovation and methods of coin transfers, processes that fit into Coinbase's general interest in the storage and exchange of digital currency.



Patent no. 48,659, John Condell, "Drawing of Artificial Arm," 11 July 1865; Utility Patent Drawings, compiled 1837–911; Record Group 241: Records of the Patent and Trademark Office, 1836–1978 (National Archives Identifier: 4516086); Cartographic and Architectural Records Section, National Archives at College Park, MD. No known copyright restrictions.



*The current state of the law strongly favors software technologies clearly tied to the physical world.*

However, only one Coinbase application thus far has successfully matured into a patent: US 9,436,935 B2, “Computer system for making a payment using a tip button.”<sup>17</sup> The issued claims are not specific to transactions of digital currency, but broadly cover the transfer of funds. The claims are directed to utilizing a physical device to transfer funds between parties. The current state of the law strongly favors software technologies clearly tied to the physical world.

In contrast, Cambridge Blockchain LLC has successfully prosecuted two blockchain technology patents related entirely to the management of digital identities on a blockchain. Cambridge Blockchain also appears to have a relatively small application portfolio of only four applications. Both of the granted patents, however, appear to have highly detailed and elaborate claims. This might be an example of seeking narrow claims to overcome a lack of strong physicality to the claims. The claims also might result in a patent that offers its wielder far less enforceability.

A series of cases has followed *Alice* in which patent claims have been found to be eligible, even though they were software-based, or even financially based. In general, the more narrow and focused the claims are, the better the chances of getting claims allowed by the USPTO. The USPTO generally frowns on the financial claims that appear simply to apply preexisting business practices to the Internet or to generic computer systems. In contrast, the types of claims that can have a higher likelihood of being found patent-eligible under 35 USC § 101 are:

1. Claims that are directed to improvements to existing technology<sup>18</sup>
2. Claims that focus on creating or generating “new data” rather than merely collecting and analyzing existing data<sup>19</sup>
3. Claims to concepts that are clearly not fundamental practices long prevalent in our system (whether financial or any software concept)<sup>20</sup>

If we are focusing on blockchain patents, and particularly patents in the fintech space, then we need to tell a story in our patent application and explain to the patent examiner that we are addressing an existing problem. Inventions that address a specific technical problem with a particular technical improvement can avoid the *Alice* minefield. Innovations that change or adapt the functionality of the blockchain (or related blockchain technology) to yield a new process that solves a particular problem would be better than those addressing a problem with general technology or a fundamental practice long prevalent in our commercial system.

#### **Wright portfolio, wrong approach**

Australian businessman Craig Wright, self-proclaimed innovator of the Bitcoin blockchain, made news by filing numerous patent applications related to blockchain technology.<sup>21</sup> According to reports, Calvin Ayre, a Canadian



*Some speculate that Wright is Satoshi Nakamoto trying to make money off the blockchain. His patent-application filing behavior suggests otherwise.*

national, has financed Wright's patent portfolio. Ayre is a fugitive online-gambling billionaire who believes Wright's patent portfolio will fetch him billions of dollars.<sup>22</sup> Reuters reported that Wright has links to online gambling that go back decades and that the original Bitcoin code was developed for gambling. Some have analyzed the early Bitcoin code and found unimplemented functions related to poker.<sup>23</sup>

Some speculate that Wright is Satoshi Nakamoto trying to make money off the blockchain. His patent-application filing behavior suggests otherwise.

First, Wright filed for 73 patents in 2016. Satoshi released the Bitcoin protocols as open-source software in 2009. Why wait seven years, an eternity in the Internet space, to file so many applications? Next, why would Satoshi need Ayre's funding? Filing 73 patent applications would be expensive, but not that expensive. Satoshi's own investment in bitcoin is reported to be over \$1 billion, easily enough to fund a patent portfolio.<sup>24</sup>

The last reason to suspect Wright's claims relates to the first two. Satoshi derived plenty of money from this invention without a patent. Why implement a late patent strategy simply to make more money?

However, recognizing that he was ahead of everyone else in a first-to-file environment, Satoshi could have been waiting for the proper time to apply for patents, thereby capturing subject matter while preserving patent term. He could have waited as blockchain technologies developed and filed his applications just before others filed, in order to capitalize on the development in the intervening years. This strategy would provide time for the various innovations to be implemented in the marketplace relatively soon after the filing dates, thereby increasing the value of the patents because they would have more term. Had he filed in 2010, for example, and blockchain technologies were widely adopted in 2020, he would have only 10 years of term for protecting licensing and royalties. By waiting until 2016, he would extend term to 16 years after 2020.

A review of the UK Intellectual Property Office (UKIPO) searchable patents journal reveals that the earliest filed patent application by Wright was 23 February 2016.<sup>25</sup> Between then and 28 October 2016, the record shows that 73 patent applications were filed. Wright uses the EITC Holdings Limited as the applicant or owner of the patents. We could not see that any patent applications owned by EITC Holdings Limited or Wright were filed in the United States.

A review of these applications reveals a focus on the platform rather than applications. For example, 19 applications are entitled "Implementing Logic Gate Fund Functionality Using a Blockchain."<sup>26</sup> Another application is titled "Recording Multiple



Transactions on a Peer-to-Peer Distributed Ledger.”<sup>27</sup> For good measure, one more is “Universal Tokenization System for Blockchain-Based Cryptocurrencies.”<sup>28</sup> The impact of the Wright portfolio on the industry remains to be seen because it is still undetermined which patent claims will result in patents. Nonetheless, this effort represents the Oklahoma land grab that worries many in the blockchain community.

*The earliest filed patent application using the term “blockchain” was filed 4 May 2013 as provisional patent application No. 61/819,575.*

In addition to EITC, other companies have filed patent applications in particular technological areas related to the blockchain. EITC holdings, which later changed its name to nChain, was sold to the Malta-based High Tech Private Equity Fund.<sup>29</sup>

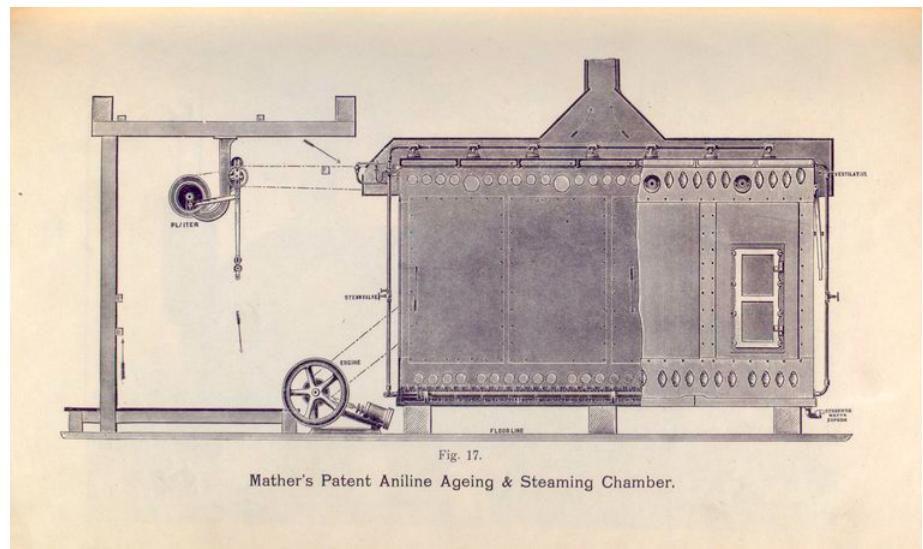


Fig. 17.  
Mather's Patent Aniline Ageing & Steaming Chamber.

Science, Industry, and Business Library: General Collection, The New York Public Library, "Mather's patent aniline ageing and steaming chamber," 1902, New York Public Library Digital Collections. No known copyright restrictions.

## The current state of the field

### Analysis of blockchain patent application filings

The earliest filed patent application using the term “blockchain” was filed 4 May 2013 as provisional patent application No. 61/819,575. Patent applications, unless specifically requested, are published approximately eighteen months after their priority date (a.k.a. their effective filing date).<sup>30</sup> If the applicant will not seek foreign patent protection, the applicant can request that the patent application not be published.<sup>31</sup> In that scenario, the application becomes public only upon issuance of a patent.

The following four figures, provided by Marc Kaufman of Rimon PC, give some insight into who is filing how many patent applications, in which areas, and from which countries.<sup>32</sup> For companies considering international patent protection, this information can help determine the countries in which to file, and thus where to make a significant investment.

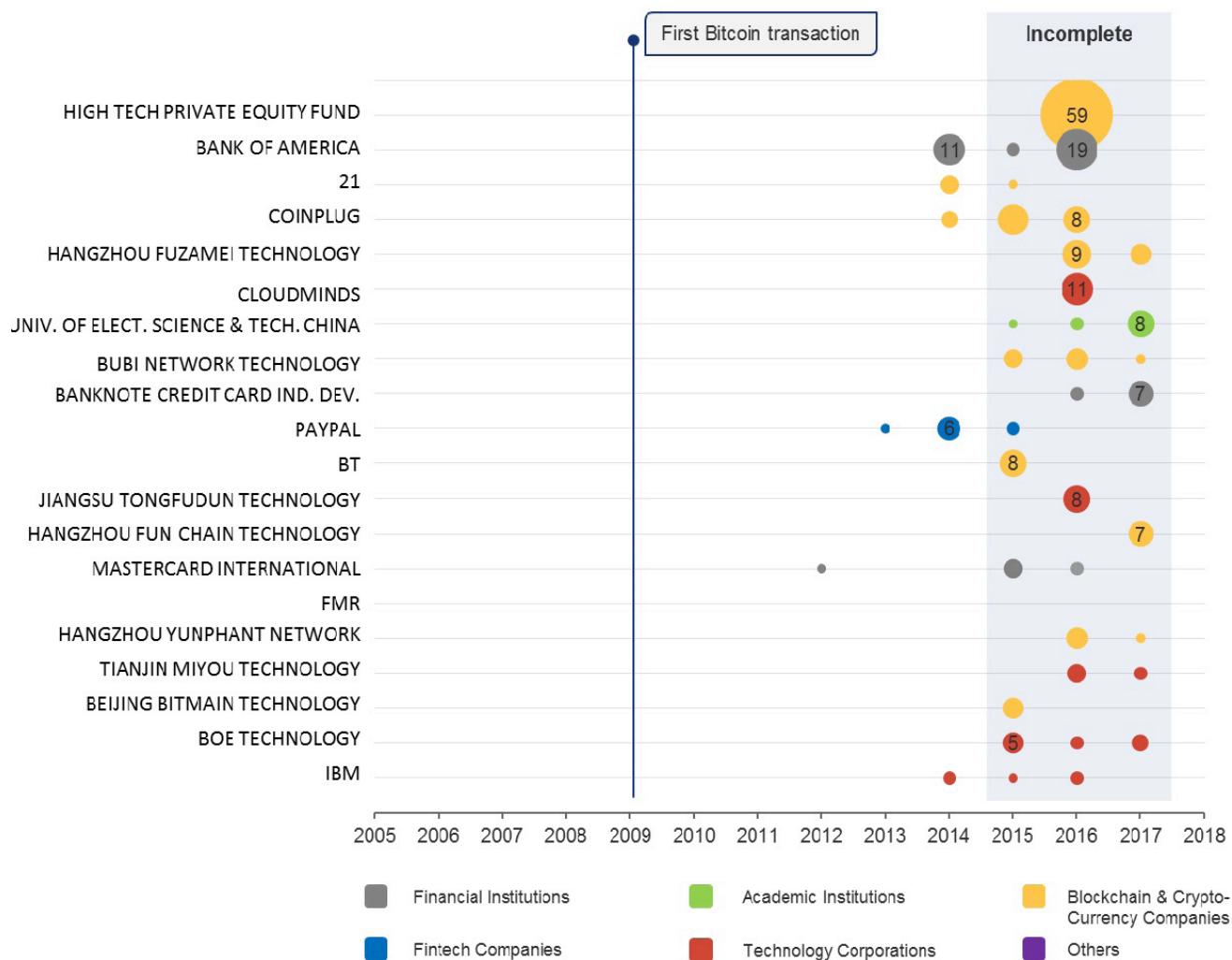


Figure 1 tracks the yearly patent application filings for the top 20 filers. Most major filers filed patents in large batches. This trend appeared across sectors, thus continuing the Oklahoma-style “land grab.” A scattershot approach covered as much ground as possible, contradicting a focused, iterative approach matching the tendencies of software development companies.

Only one firm in the fintech company category—PayPal—made the top 20 list. By far, the most prolific filer is the High Tech Private Equity Fund, Craig Wright’s portfolio.

Blockchain and cryptocurrency companies loomed large, as expected, alongside financial institutions. What such a trend indicates is difficult to predict. However, both staple institutions and vanguard firms displayed the highest filing rate and, thus, bolstered optimism for the

## Figure 1: Top 20 filers of blockchain-related patents



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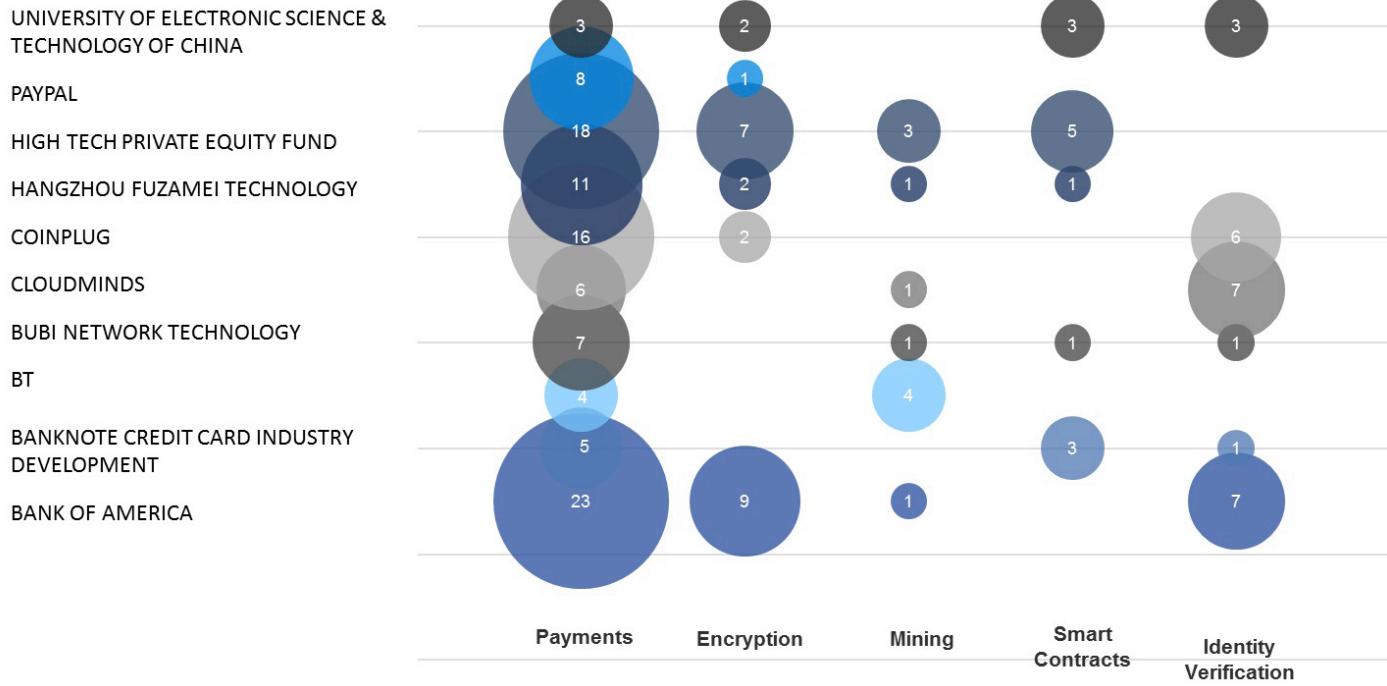
*Both staple institutions and vanguard firms displayed the highest filing rate and, thus, bolstered optimism for the increasing traction of blockchain technologies.*

increasing traction of blockchain technologies. For a new technology to replace legacy systems, legacy actors must implement it.

Viewing the top 10 filers' application portfolios by technology category at Figure 2 further supports the land-grab hypothesis. Most firms have filed in three or more distinct technology categories. Furthermore, certain technologies are fairly antisymmetric; that is, smart-contract filers do not file many encryption-related applications, although the two technologies are in eight of the top ten filers. This could be a coincidence common to nascent technologies, or the technological development could be diverging between two distinct aspects of the blockchain. Note the filings by High Tech Private Equity Fund, which purchased Craig Wright's patent portfolio.

The investment in payment systems appears to be steady, whereas the investments in mining and encryption are on the decline, possibly because adequate solutions have been identified for known problems. As an indication of platform maturity, the investment in smart contracts has ramped up from five percent to 20 percent total dollars between 2014 and 2016. The investment in identity verification has also rapidly developed, from no charted investment in 2014 to seven percent in 2015, and then to nearly triple the 2015 level at 20 percent in 2016.

**Figure 2: Top ten patent filers in the technology category**



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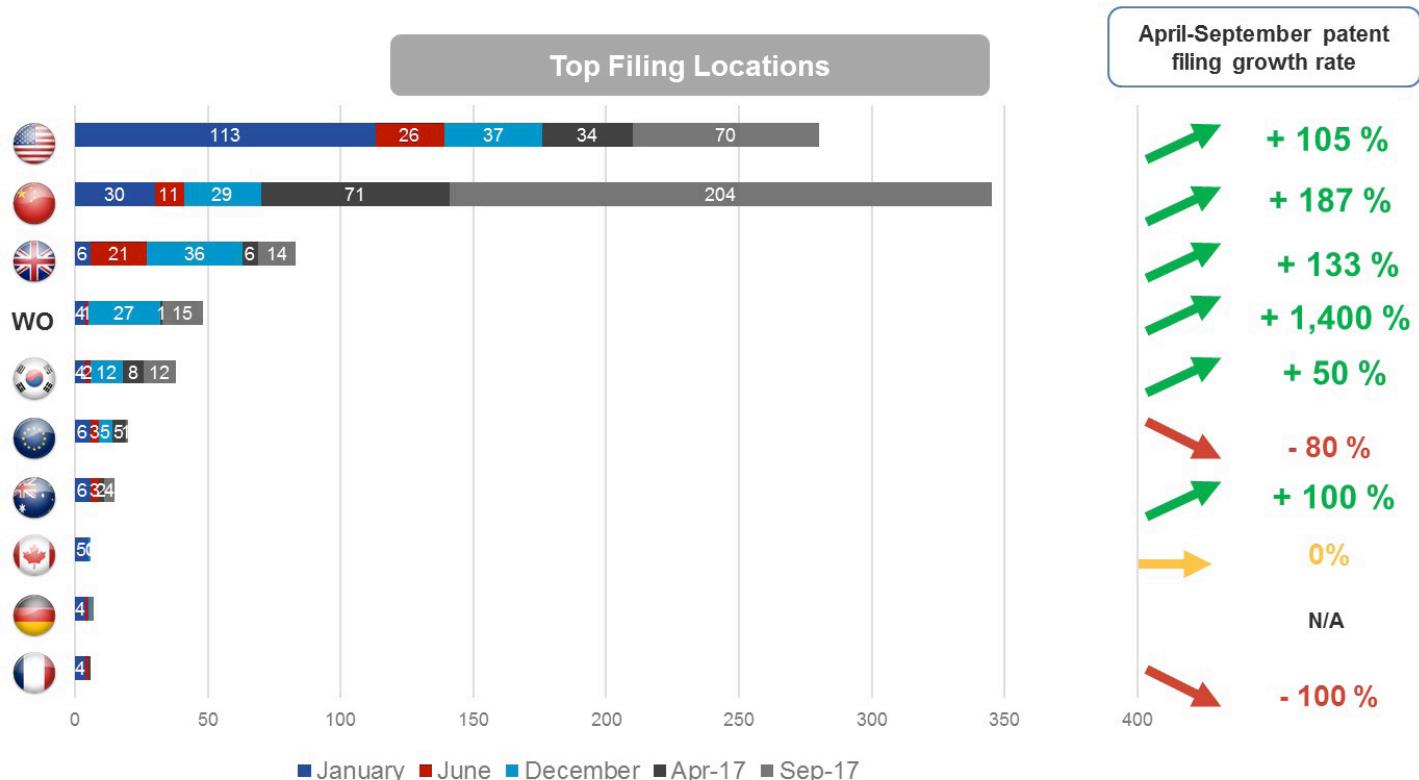


Finally, several companies, CloudMinds and Bank of America among the top 10, dominated identity verification. This could be an emerging development waiting to catch on or a dead end where others know not to go. Intuitively, identity verification would be necessary to develop the decentralized data tracking linked to payments and other financial transactions in the modern world. A core principle of bitcoin at the heart of the blockchain revolution, however, is the liquidity and pseudonymity of digital currency—a concept relatively antithetical to real identity verification.

Figure 3 illustrates the top filing locations and includes the April-September patent filing growth rate. The United States and China lead the charge with the greatest number of patent filings for blockchain technologies by far. Other than Great Britain at third place and WIPO (the World Intellectual Property Organization, one of the UN's specialized agencies) at fourth place ("WO" is shorthand for WIPO in the figure), the other countries each represented a tenth or fewer of the number of filings as in the United States.<sup>33</sup>

The four countries with the highest growth rate between April and September 2017 include the United States at 105 percent, Great Britain at 133 percent, China at 187 percent, and WIPO filings at 1,400 percent.

**Figure 3: R&D indicator: Where entities are filing their blockchain-related patents**



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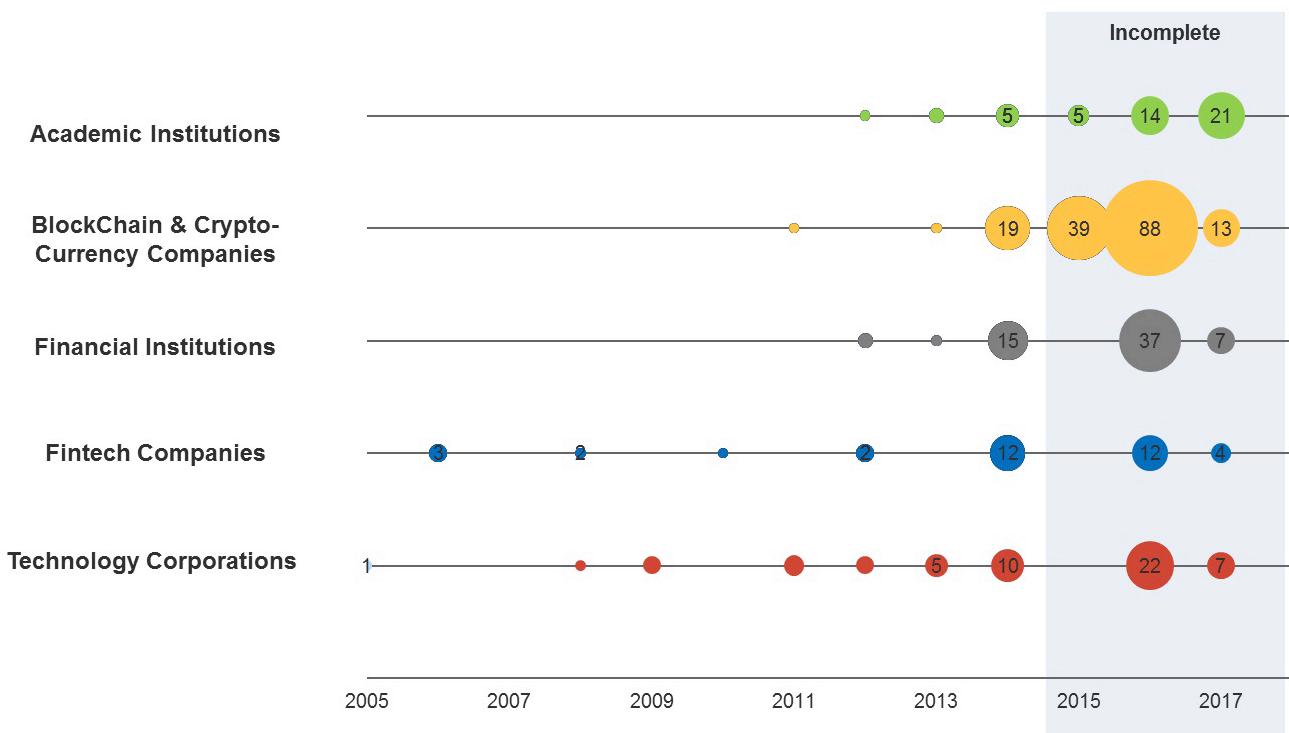


Investment dollars have been applied most to payment systems, encryption, and mining (Figure 2 and Figure 4). Figure 4 highlights the fact that the largest number of filings comes from blockchain and cryptocurrency companies, followed by financial institutions. Academic institutions are filing about the same amount of patent applications as technology corporations.

### Overview of blockchain-related patents granted

While the above analysis of patent applications can inform us of the state of industry actors, an overview of patents actually granted can illuminate the state of the USPTO and tell us where the industry should be. Now we turn to the blockchain-related patents granted and look at a few critical patents. As blockchain technology is relatively new within the world of patents, the prolonged and multi-year process of obtaining a patent is not completed for most applications; and the outlook is very likely to be a moving target for quite some time.

**Figure 4: Investment trends by technology category**



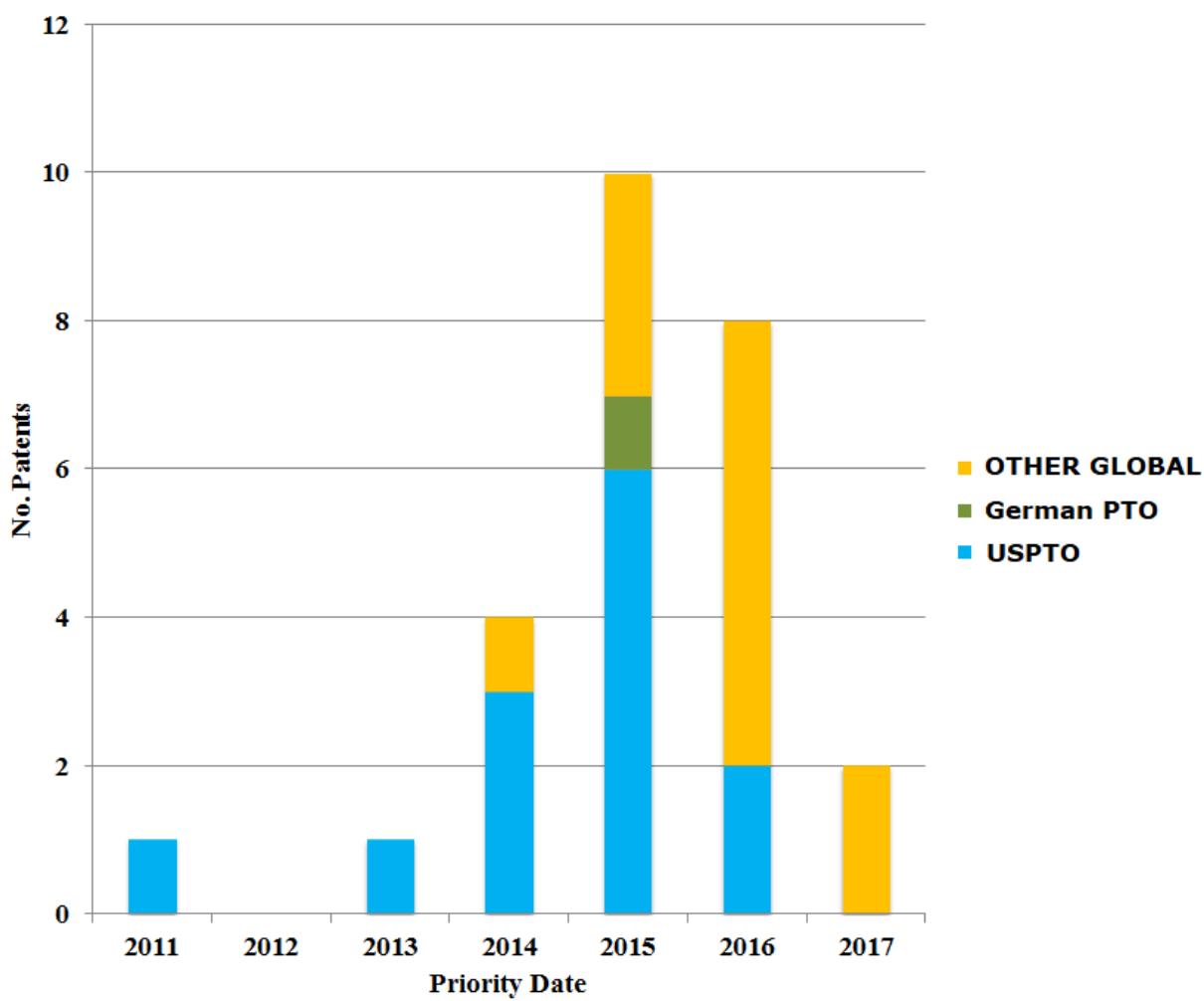
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As we can see in Figure 5, patent grants take time to start making their way through the various global patent offices.<sup>34</sup> They do appear to be picking up steam, however, aside from a slight slowdown in 2016. That the 2016 slowdown appears to coincide largely with a slowdown in US patents is noteworthy.

The relatively large contribution of “Other Global” patents in 2016 might be misleading for reasons that will be discussed shortly, but it is noteworthy, nonetheless, in that it informs us that these grants are a global phenomenon that seems to track somewhat proportionately over past years. The absence of European Patent Office, WIPO, and Japan Patent Office grants is curious, however, given the application filings we discussed earlier.

**Figure 5: Blockchain patents by priority date**



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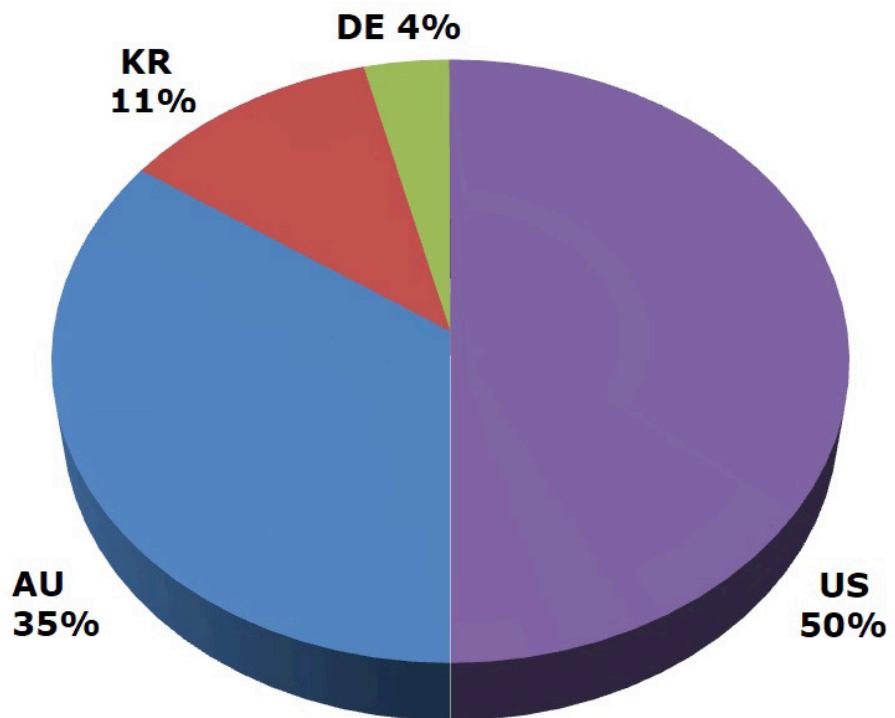
*Intuitively, for any sort of pool or shared patent scheme to take hold, we would hope for an industry in which patents were spread across multiple companies.*

Figure 6 provides more insight as to which national offices are issuing the most patents. The USPTO is the clear leader, responsible for half of issued patents; however, Australia (AU) has granted over a third of the patents related to blockchain technologies. The Australian number is likely misleading, though, because it includes issuance of "Innovation Patents," which require only formalities to "issue" but remain unenforceable until a full examination has occurred. Upon further review of the Australian patents, it appears quite likely that most of these will face a difficult challenge in achieving enforceability, if they can achieve it at all. South Korea (KR) is third with 11.5 percent, and Germany (DE) has 3.8 percent of the overall issued patents.

Intuitively, for any sort of pool or shared patent scheme to take hold, we would hope for an industry in which patents were spread across multiple companies. A single entity having bulk control of critical technologies leaves no incentive for that entity to enter any sort of sharing scheme. In fact, its patent dominance would likely incentivize it against entering the scheme.

#### Figure 6: Top patenting countries of issuance

The patent offices of Australia (AU), Germany (DE), South Korea (KR), and the United States (US) are issuing the most blockchain-related patents.



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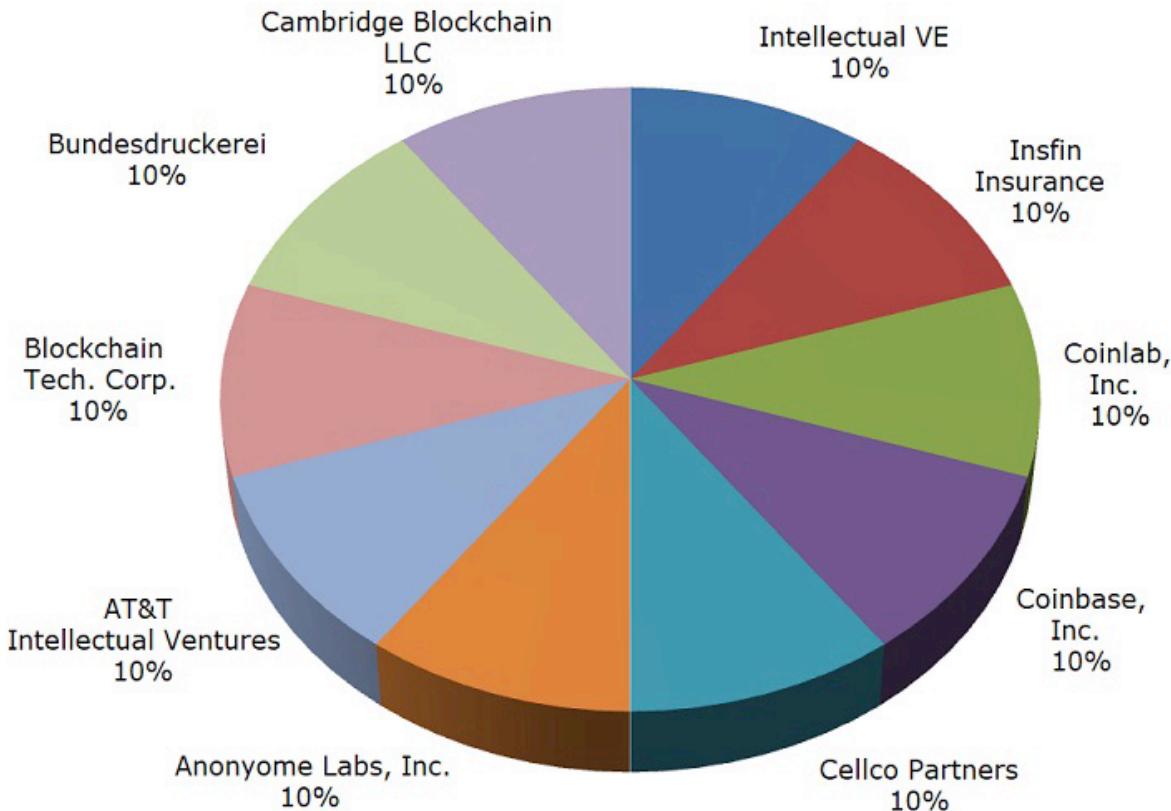


It is a fortunate circumstance, then, that granted patents appear to cut across multiple companies evenly. The top 10 patent owners each hold only a single patent (Figure 7). This likely has more to do with the nascent nature of the technology than anything else, but it lends solid footing to any of the industry patenting schemes discussed above.

Of the handful of patents on blockchain technologies that have been actually granted so far, only a small number appears to have potentially foundational repercussions. Coinlab's "System and Method for Analyzing Transactions in a Distributed Ledger" (US9298806 B1, "806") and Blockchain Technologies Corporation's "System and Method for Creating a Multi-Branched Blockchain with Configurable Protocol Rules" (US9608829 B2, "829") each potentially cover varyingly core aspects of blockchain technology that are tied to the technology rather than to a particular application of it. The remainder of the granted patents trend strongly toward domain-specific implementations. We examine both of these patents as possible exemplar cases in the context of an essential patent pool.

The '806 patent to Coinlab is directed to analyzing a ledger to "identify" otherwise anonymous transactions. The ability to de-anonymize or otherwise track cryptocurrency transactions is valuable to a variety of actors, including governmental agencies involved in

**Figure 7: Top ten owners of blockchain-related patents**



law enforcement, marketing firms, and more. While the specification of the patent is relatively detailed, the claims could be broadly interpreted.

Generally, the '806 patent claims identify compound transactions and associate the addresses involved with a first address group and a second address group, decide whether to associate the two previously identified groups based on criteria, and save the results for later analyses that might perform the same basic tasks and use recorded analyses as input. This very broad set of limitations could very well apply to almost all ledger analyses—a prime example of a patent that would be considered for a pool or other sharing scheme because any sort of analytics, security-related or not, performed on a ledger will likely fall within the language of the claims.

Blockchain Technologies Corporation's '829 patent is, very generally speaking, directed to a forking blockchain with updatable rules along forks and wherein all forks are stored on-chain (as compared to forks simply existing as parallel, separate chains). At first glance, this sounds like a foundational technology patent. However, the structure of the claims—the part of a patent that is actually enforceable—tells a potentially different story. (See Appendix on '806 and '829 patent claims.)

The claimed method recites no fewer than 12 steps and, overall, provides at least 15 elements. This is a complex claim: any finding of infringement would need to show that every single element had been infringed—that is to say, not only must each of the 12 steps be performed, but they must also be performed as they are described within the claim itself. In this case, a thorough vetting of the patent by technology and legal experts would be needed to determine the criticality of this patent.

If experts found the claims to be easily designed around or nonstandard operations, this patent might be deemed unnecessary to the pool or sharing scheme. On the other hand, the claims could merely be rote steps obfuscated by convoluted language and, no matter what a later inventor does, they would be infringing if they were to construct a forking blockchain that allowed rules to be modified along the chain.

*Consider a claimed method that recited no fewer than 12 steps and provided at least 15 elements. Any finding of infringement would need to show that every single element had been infringed.*

## Strategies for avoiding the land grab

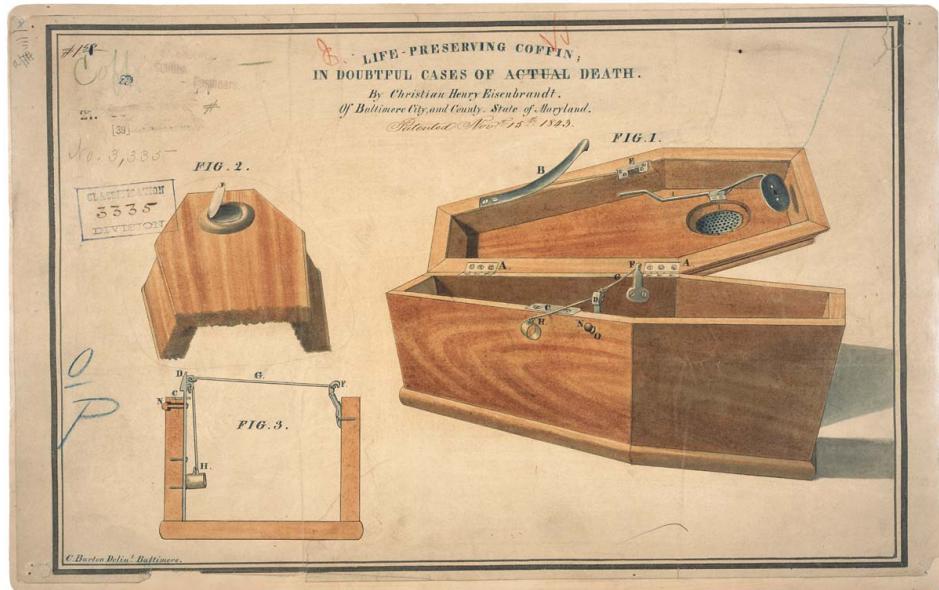
Below, we provide three potential solutions to avoiding the patent land grab mentioned above. Admittedly, no solution is perfect, but each of the solutions below provides varying likelihoods of success and efficacy. First, we describe a standard pool. Second, we propose a pool intertwined with an application of blockchain technology to blockchain patents that could have broader applicability than just to the domain of blockchain patents. Finally, we consider the merits of a traditional norms-based approach.



## Patent pools

*Providing inventors with exclusive rights to their respective discoveries promotes the progress of science and the useful arts.*

Within the blockchain ecosystem, there is tension between patenting and not patenting. Filing a patent application for offense protects a company's investments, and filing one for defense protects its innovation. A more communal approach shares ideas and intellectual property with the ecosystem that, in some respects, can detriment a company. Protecting a company's investment in intellectual property through patents has advantages. Start-ups with limited resources can protect themselves from larger corporations that might discover their innovation and copy or reverse-engineer it using their greater resources and then compete with those start-ups or put them out of business. The US Constitution is correct: providing inventors with exclusive rights to their respective discoveries promotes the progress of science and the useful arts.



Patent no. 3,335; Christian H. Eisenbrandt, "Drawing for Life-Preserving Coffin," 15 Nov. 1843; Patent Case Files, 1836-1976; Record Group 241: Records of the Patent and Trademark Office, 1836-1978 (National Archives Identifier: 595517); National Archives at College Park, MD. No known copyright restrictions.

*If a participating company develops technology in a particular area, such as precision medicine, the company could access the database to see which other innovations have been published in that space.*

However, obtaining patents is expensive and speculative. Software innovation can change form yearly, and so a company's perceived crown jewel of an invention one year might be obsolete the next. In a more communal approach, innovators share their innovations and replace the time and energy spent on filing patent applications with increased efforts at research and development. Strategies for this more communal approach have included developing a database of prior art and/or filed patent applications that the ecosystem can access and determine whether a particular innovation is novel. For example, a pool could develop a database that gathers publications related to the blockchain. If a participating company develops technology in a particular area such as precision medicine, the company could access the database to see which other innovations have been published in that space. If companies agreed to share



their IP, at least disclosing the patent applications, the ecosystem could have a more advanced view of applications filed.

Although the USPTO does not publish applications earlier than eighteen months after a priority date, companies could join within the community to provide patent applications upon filing, making the knowledge of each application available much earlier than the Patent Office publication schedule. A contributing company might lose some strategic advantage and development associated with its innovation by sharing, but the ecosystem generally could benefit by avoiding duplicate innovation, which could lead to infringing a later-issued patent. A competitor could see the recently filed patent application and avoid directing its development at the same subject matter.

A trade-off between a limited monopoly on invention and disclosure of that invention is to teach the industry about valuable innovation. If public disclosure of a valuable concept is pushed to an earlier date, then the overall ecosystem could benefit. Such a system, however, would likely have to be implemented via a policy or culture within the community, with perhaps early patent filers taking the lead in voluntarily publishing recently filed patent applications. If all blockchain-based technology companies were to publish their filed patent applications immediately, the database of publications would likely be more like 1,000 publications rather than several hundred.

*A trade-off between a limited monopoly on invention and disclosure of that invention is to teach the industry about valuable innovation.*

There is at least one major split among the perspectives of potential patentees. While some believe that it behooves them to gain a competitive edge, others take a more defensive or communal approach to their patent strategy. For example, Erik Voorhees, CEO of ShapeShift, is not overly concerned with the patent landscape at this stage. Like other leaders in the blockchain space, ShapeShift has a defensive patent strategy designed to protect its innovation from patent trolls.

Another challenge within the community would be how and whether companies should share or render unenforceable their issued patents. Several mechanisms could achieve this result. Individuals can voluntarily disclaim any term of their patents, thus rendering them dedicated to the public. Companies can assign their patents to a consortium that is a trusted entity with a policy of non-enforcement. Sometimes patent pools have developed that can provide competitive benefits and reduce transaction costs, and sometimes clear blocking patents from the market. Of course, companies can reduce their litigation costs.

In a patent pool scenario, companies will pool patents in a particular technological area and then purchase a license to the pooled patents, usually at a reduced rate from what would be negotiated for individual patents or patent families. However, patent pools create competitive problems, conferring market power upon a group with member-owned patents or an entity with a standalone patent pool. Antitrust enforcement concerns arise if the pools are over-inclusive and include competing technologies. The ultimate problem is that patent pools can leverage their position and impede competition.



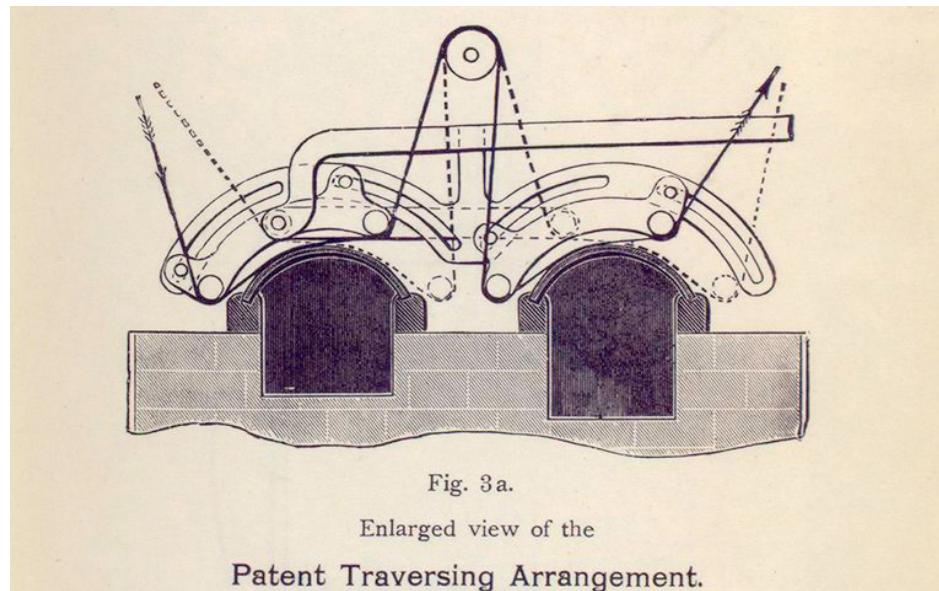
Some primary concerns with patent pools or similar structures include the following:

- » Pools do not allow companies to obtain and enforce their patents individually.
- » Pools involve collusion between larger entities within the ecosystem.
- » Pools can discourage research and development.
- » After establishing the pool, patent protection for new products or software might no longer available.

*Innovators receive some compensation for their patents, patents are ultimately taken off the market, and members of the defensive patent pool receive a license to the purchased patents.*

Some patent pools are created for defensive purposes.<sup>35</sup> A group of companies forms a defensive patent pool, and each firm pays yearly dues depending on its income. The defensive patent pool seeks to buy patents that might relate to its members' businesses. Innovators receive some compensation for their patents, patents are ultimately taken off the market, and members of the defensive patent pool receive a license to the purchased patents.<sup>36</sup>

The principles above could be applied within the blockchain ecosystem. Basic underlying "essential" patents within the blockchain space could be pooled or provided. Assume twenty-five of the hundreds of the published patent applications related to blockchain technology issue into blockchain essential patents. These twenty-five essential patents could represent underlying foundational patents that any blockchain company would infringe. For example, had Satoshi Nakamoto filed a patent application for the basic public distributed ledger concept of the blockchain in 2009, and had that concept been issued a patent in 2012, then such a patent would be broad enough to encompass essentially any application of the blockchain in the various business models.



Science, Industry, and Business Library: General Collection, The New York Public Library, "Enlarged view of the patent traversing arrangement," 1902, New York Public Library Digital Collections. No known copyright restrictions.



## A blockchain-patent blockchain (BPB)

We now present a solution to straddle the need for fair concept compensation for valuable innovation and the need to support and enable an ecosystem to innovate without fear. The solution combines principles of the blockchain and the approaches used to manage patent pools. These approaches follow leading thought leaders in the blockchain space, such as those of the Blockchain Research Institute. The intellectual property issues outlined are important to the blockchain community, and this paper represents an effort to enable the blockchain technology to lift all boats in a rising tide.<sup>37</sup>

The blockchain is built from a series of blocks validated periodically by members in the community. Those who validate are paid in a cryptocurrency and are called “miners.” As the size of a blockchain ledger increases and the rate of transactions (financial or otherwise) accelerates, the time and cost of validating each new block in the chain increases. Some are concerned that the proof-of-work validation model used in the Bitcoin blockchain will become too arduous for the cryptocurrency payout to justify the cost and energy spent mining the block. Other methods might need to be developed to validate the ledger.

The first step to creating a patent pool of essential blockchain patents could be to establish an entity that would manage the process on a limited funding and volunteer basis. The entity could function similar to RPX Corporation, in which members of the company pay dues and the company then buys patents or patent portfolios and provides them “royalty-free” to its members.<sup>38</sup> There might be some differences between such an approach and its more traditional counterpart.

Second, guidelines would define an essential patent in the blockchain space. The guidelines would include determining whether a particular patent would have to implement blockchain innovation in various contexts. For example, the evaluation would consider whether a blockchain company recording real-estate deeds, a blockchain company storing a detailed history of every cut of beef sold, and the blockchain company implementing a new cryptocurrency would all require a license to a particular patent.

Stakeholders performing this evaluation could receive an identification, from any person or entity, of the patent to be considered. The management entity, upon identifying a potential patent deemed essential to the blockchain technology, would manage the distribution of that patent to the stakeholders, who would study the patent and provide their evaluation of whether a license to that patent would be generally required within the ecosystem. Stakeholders could include patent professionals and industry leaders trained on basic patent-evaluation techniques.

*For any patent to be added to the essential patent blockchain, all or a percentage of the stakeholders must verify the respective patents to be essential.*

For any patent to be added to the essential patent blockchain, all or a percentage of the stakeholders must verify the respective patents to be essential. Each patent represents a block in the essential patent



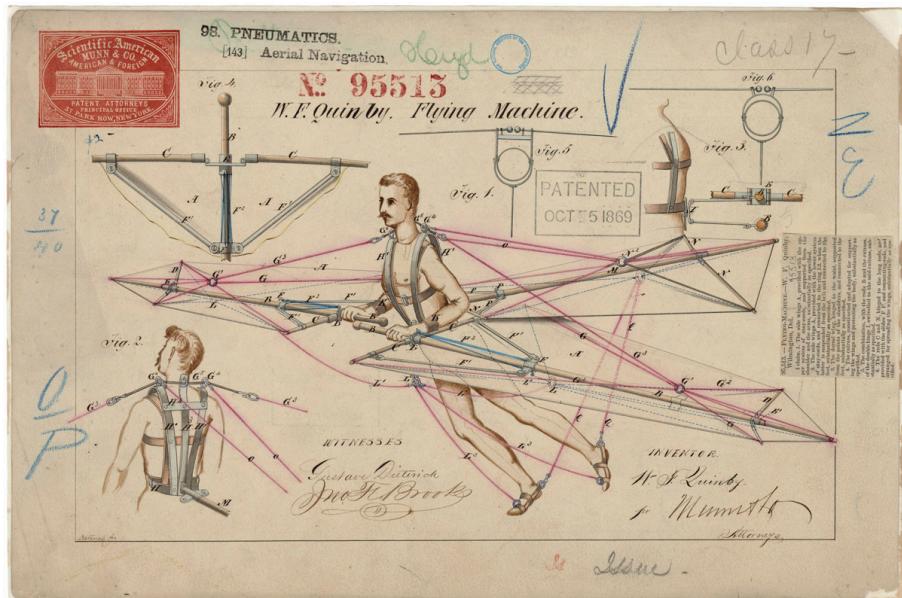
blockchain, and the blockchain could be made public. Stakeholders could receive value for their participation in the process by receiving credits on their yearly dues to participate. The value provided would be independent of whether a patent is essential or nonessential. An evaluator would not be pressured to inflate the potential of a patent's being essential to practicing blockchain technologies.

*Incentives could be provided for individuals who voluntarily submit or pre-evaluate their own patents for submission to the essential patent blockchain.*

Incentives could also be provided for individuals who voluntarily submit or pre-evaluate their own patents for submission to the essential patent blockchain. Using such a model, an open process could be established in which companies could obtain a valuable view of the intellectual property landscape in which they are innovating.

The pool could also receive published applications. The claim of a published application is not finalized or patented, and so is not enforceable and highly likely to change or be narrowed. However, the pool could include a separate blockchain for published applications, which could provide further insight into potentially future patents.

Entities that own patents deemed essential would be paid a fair compensation from the dues provided, or from other sources. One challenge of models in which individual companies invest in the cost of obtaining patents and then dedicate them to the ecosystem is that they receive no compensation for the very expensive patenting process. The proposed essential patent blockchain patent pool would use best practices from previous patent pool experience, and provide the proper incentives for patent holders, stakeholders, and the ecosystem in general to balance the need for compensation and recognition of valuable innovation and the need for a robust and innovative ecosystem.<sup>39</sup>



Patent no. 61,409; Robert E. Ellerbeck, "Drawing of Improvement in Skates," 22 Jan. 1867; Architectural and Engineering Drawings, 1837-1911; Record Group 241: Records of the Patent and Trademark Office, 1836-1978 (National Archives Identifier: 595008); National Archives at College Park, MD. No known copyright restrictions.



Furthermore, utilizing a blockchain for patent pools would make available a host of other technologies to help streamline licensing, negotiation, and enforcement. Automated review systems become more feasible because of implicit and explicit structuring of the data along the chain. High-fidelity tracking of changes would be inherently provided. Finally, it would provide a testing bed for other industries to move their pools to a blockchain system as well—outside of aesthetic preference, nothing prevents non-blockchain domains from implementing the exact same system.

Application submissions would also be easier to integrate into a singular blockchain rather than a second blockchain, run independently and in parallel to the BPB. An application could simply serve as a root block for a fork in the blockchain, just as a granted patent. Upon grant, a new block would be added detailing the new status and include the updated claims.

In any iteration of this solution, community participation remains crucial in vetting the patents on the BPB. Creative design of a proof-of-work algorithm could be applied that incentivizes participation and adheres to the design principles of blockchain technologies. The precise shape of such a proof-of-work algorithm would need to be carefully and thoughtfully developed to ensure success of the BPB.

## Example implementation of the BPB strategy

The following is a specific example of the BPB approach. Published US Application No. 2017/0177898, “Personal Ledger Blockchain,” is assigned to IBM. Blockchain stakeholders could review this type of patent application. In the application’s own words, the application is directed to “storing encrypted data in a blockchain.”<sup>40</sup> The concept itself is relatively straightforward to understand, and the pending claims follow suit in their breadth. Claim 1 reads:

**A computer-based method comprising:**

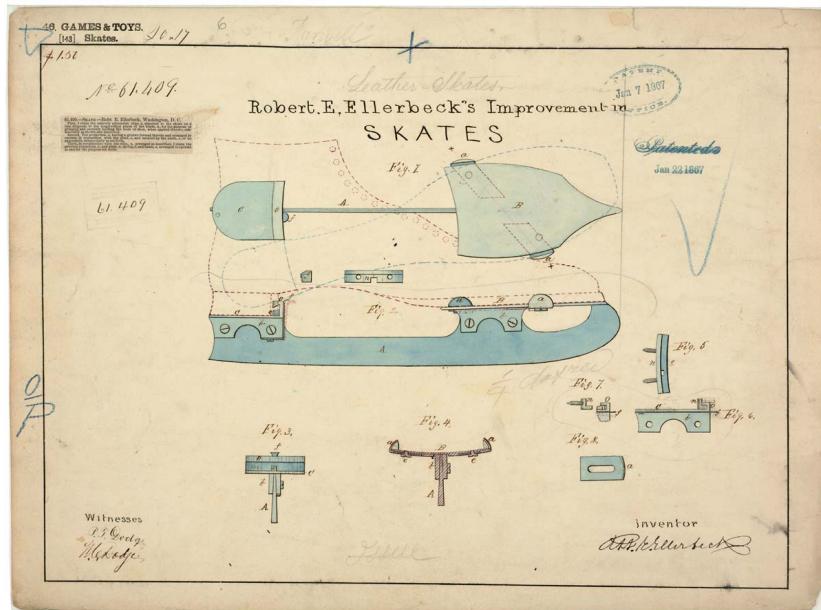
- » Accessing, by a processor, a transaction database shared by all computing nodes participating in a system based on a blockchain protocol, the transaction database including transactions and blocks, where the transactions are data to be stored in the blockchain and the blocks are records that confirm when and in what sequence certain transaction became journaled as part of the blockchain;
- » Receiving a request signed by a user system to include a new transaction with additional data in the blockchain, where the additional data have been encrypted with an encryption key; and
- » Adding a block that records the new transaction with additional data in the blockchain.<sup>41</sup>

*In any iteration of this solution, community participation remains crucial in vetting the patents on the BPB.*



Generally, the claim above covers encrypting data stored on the blockchain. The claim has been published but not granted, and might change during prosecution before being allowed. In industries where data security is critical, such a claim applies to all blockchain usage. For example, a medical records blockchain would almost certainly necessitate that the patient records be encrypted. The result is that medical records-related blockchain technology would need to license a granted patent, including the above claim, to operate.

More areas than simply medical-related technologies would view this extra layer of encryption as critical. Aside from industries that have regulatory requirements necessitating usage, any firm interested in offering such a feature as a generically better value proposition to its customers would certainly consider the patent to be critical to its operations. A technology as fundamental as that recited by the above claim is key across all sectors because many consumers have come to expect it in all their technologies. (Whether this raises issues of obviousness is a different, albeit very valid, discussion.)



Patent no. 61,409; Robert E. Ellerbeck, "Drawing of Improvement in Skates," 22 Jan. 1867; Architectural and Engineering Drawings, 1837-1911; Record Group 241: Records of the Patent and Trademark Office, 1836-1978 (National Archives Identifier: 595008); National Archives at College Park, MD. No known copyright restrictions.

*The value of the claim is in its broad applicability. However, that broad applicability also makes it more vulnerable to challenges.*

Such a patent would be a fundamental technology to a large variety of markets and, therefore, would be a target for an essential blockchain patent pool. The pool's incentive structure to induce the holder of such a broad patent to enter it into the pool would be the deciding factor in keeping this technology open to the public. Royalties, pool access, and good public relations might be sufficient carrots. The broadness of such a claim also allows for a very effective stick to be put in the hands of pool members.

As mentioned, the value of the claim is in its broad applicability. However, that broad applicability also makes it more vulnerable to challenges on, at least, obviousness grounds. At the root of it,



if everyone in industry knows that encrypting data stored on the blockchain is the next logical step in iterating the technology, and there is no particularly difficult technical challenge in doing so, there is good reason to believe that the so-called innovation is fairly obvious and likely to be judged so during traditional patent prosecution as well as in a post-grant review.

*If everyone in industry knows that encrypting data stored on the blockchain is the next logical step in iterating the technology, and there is no technical challenge in doing so, then the so-called innovation is likely to be judged obvious during traditional patent prosecution.*

## Voluntary communal coordination

The alternative approach to the above would be a purely norms-driven approach without the appeal of using innovative technology to innovate on our technology law. The norms-driven approach would rely upon the individual choices of companies innovating in the blockchain. There are challenges to this approach, and even the solutions suggested above, in that any individual company does not have to share its intellectual property with the community, which weakens its ability to protect its own valuable intellectual assets.

However, community members could implement a strategic approach to encourage companies to implement patent policies that let them protect some of their core intellectual properties without acting as though they are eager settlers in 19th-century Oklahoma. This approach would include several components.

The first would be education. Industry leaders and organizations such as the Blockchain Alliance and the Chamber of Digital Commerce could agree upon a suggested framework that could be published and shared throughout the industry.<sup>42</sup> The principles of the framework would represent suggestions to companies to implement voluntarily those patent policies consistent with the framework.

One example framework could be to encourage companies to publish blocking technology or “open-source” blocking patents to the community. Patents more narrowly confined to a particular vertical or application, but which would not block or affect blockchain-based technologies implementing different business types, would be obtained to protect the interest of that company.

One way to implement such a policy cheaply would be to take advantage of the “first to file” system implemented in the America Invents Act, signed on 16 September 2011. For patent applications filed on or after 16 March 2013, US law recently harmonized with other jurisdictions such as Canada and Europe. While the America Invents Act provides a grace period before applying for a patent, thereby giving some wider latitude to inventors who publish their own disclosures, one easy approach to preventing others from patenting any technology would be to publish a document that describes the invention.<sup>43</sup>

For example, if the Acme Blockchain Innovation Company (a fictional firm) discovered an improvement to basic blockchain technology that more effectively prevented hacking than existing technologies, and that improvement would likely be applied across the industry, then Acme could publish that innovation on its website or via a publishing



service run by an entity such as the Chamber of Digital Commerce. Since Acme published the invention, no other entity could thereafter file a patent application seeking to monopolize that innovation.

A relatively inexpensive service can be provided to the blockchain industry to enable easy access to a publication service that stores a searchable listing of such innovations. Again, however, the challenge is to educate the industry. So companies will have to publish voluntarily when tempted to patent those innovations.

In practice, voluntary publication already happens to some degree in the blockchain space. A quick search for “blockchain” on GitHub found 6,857 repositories.<sup>44</sup> While it is unlikely that every single repository provides actual innovative code for blockchain projects, the sheer volume of repositories indicates the immense interest in the technology among the open-source community. This strongly correlates with observations from those active in the industry where the belief often is, as ShapeShift CEO Erik Voorhees puts it, that “most of the foundational stuff has been designed and has been explicitly open-sourced from a very early stage.”<sup>45</sup>

*Another aspect of this first prong of a voluntary solution would be to urge companies holding blocking patents to render them unenforceable or agree to offer royalty-free licenses.*

Another aspect of this first prong of a voluntary solution would be to urge companies holding blocking patents to render them unenforceable or agree to offer royalty-free licenses. This would align with the interests and motivations of some companies, who often acquire patents for a purely defensive purpose.

Consider Voorhees’ stance, that “[ShapeShift] wouldn’t go after other people for using the technologies [patented by ShapeShift].” The reasoning provided for seeking patent protection was the belief that such a stance, according to Voorhees, was a minority stance and so “the reason I wanted to get the patents [was] so no one could use them against [ShapeShift].”<sup>46</sup> A patent pool would go a long way to alleviate these concerns by corraling the wagons among those producing patents.

### Smart-contract crowdfunding of essential patents

Patents can be granted on essentially open-source technology or industry-standardized technologies like the blockchain, or based on underlying Internet technologies. There might be a number of participants in a standards body who would not want patents to affect the expansion of an adoption of the standard.

Another potential avenue for balancing out the needs of inventors to receive compensation and the industry’s need to be free to innovate would be the use of the *initial coin offering*, or ICO. An ICO is an offering where an entity offers investors units of a new cryptocurrency or cryptotoken in exchange against cryptocurrencies like bitcoin or ether. An application of Ethereum’s smart contract system (The Ethereum Virtual Machine) could be to create a simple token, which could be transacted on the blockchain. The new



smart contract can be used as a distributed platform for crowdfunding and fundraising related to essential blockchain patents or any patent portfolio. ICOs have been used for providing a decentralized platform for cloud computing (Dfinity), streaming video (Singular DTV), and many other uses.

How could we apply this concept in the patent world? The answer could lie in establishing an ICO in which individuals could purchase tokens from an entity and the entity could run a smart contract that would bring stakeholders together to manage the sale of patents. For example, if an inventor conceives of an essential blockchain invention and obtains a patent that everybody would need to use for efficient or effective blockchain technologies, a "patcoin" token could be created and sold, which would fund the operation of a smart contract to manage the process of compensating the inventor and making the patent open source for all to use.

A mining operation for patcoins could be processed by the smart contract such that, once the inventor submits his or her patents to the smart contract, qualified evaluators could mine coins by providing their objective evaluation of the patent and whether it is essential to blockchain technology. A consensus could be obtained from the various participants, who could each receive certain mined coins for their efforts. Other experts in patent valuation could also review the patent in the marketplace and provide input on its value. With this information, potential buyers affected by the patent could pledge a certain amount of money in order to compensate the inventor.

Imagine another scenario where a patent holder places a patent or portfolio into the smart contract with certain parameters for its sale. The patent holder might include data outlining the case for infringement or for the essential patent to the blockchain or to any other technology. A patent owner could mine patcoins merely by submitting a patent into the system. Evaluators could review the material and provide their input on the strength of the case. Once the original evaluation is complete and a cost established in the smart contract, participants in the industry would be notified of the case and given opportunities to help fund the purchase of the patent. If the patent owner in this example is asking for \$10 million, various potential infringers could each evaluate the patent and contribute some money by way of crowdfunding the sale.

Money "transmitted" to the smart contract can be held in a type of escrow that is not available to the patent owner until the threshold cost is met, at which point the smart contract would release the money to the patent owner and perform the necessary functionality associated with the patent to make it either open source, licensed to those who contributed, abandoned, or other option.

*Once the original evaluation is complete and a cost established in the smart contract, participants in the industry would be notified of the case and given opportunities to help fund the purchase of the patent.*



One potential mechanism for accomplishing the affirmative abandonment of the patent, thus making it essentially “open-source,” would be the following: the patent owner could submit into the smart contract signed documents such as a power of attorney and signed form, which indicates an affirmative abandonment of the patent. Subject-matter experts, such as reputable attorneys at patent law firms, could provide a confirming consensus that the documents would properly provide a power of attorney and an abandonment of the patent if they were filed with the patent office. With these documents stored within the smart contract, the smart contract will then receive payment from those who desire that patent to be made open source.

Envision Amazon’s one-click purchasing patent and the societal interest for that patent to be made open source. That patent has been valued at \$2.4 billion, and many companies would likely have desired to pay a fair, small price in order for that patent to have been made available to the public seventeen years ago, rather than only on 12 September 2017, the date the patent expired.

*With these documents stored within the smart contract, the smart contract will then receive payment from those who desire that patent to be made open source.*

The smart contract would be programmed to release the documents to an authorized law firm once the desired amount is received. The documents could be simply transmitted via email to the listed party. The law firm could then file a power of attorney form with the patent office and file the express abandonment document. In a short period, the patent office would confirm abandonment of the application with a *notice of abandonment*. The notice of abandonment could be submitted to the smart contract with a confirmation from the law firm that the patent is indeed abandoned. Other reputable attorneys could also be engaged, such that a consensus among them is input to the contract to ensure that the patent is in fact abandoned.

Further, patcoins could be mined for those participants (buyers) who completed a successful transaction. Part of the proceeds could be used as distributions for the patcoin holders. Thus, all the participants who submitted money into the smart contract to purchase a particular patent could receive patcoins if the threshold is met in the transaction occurs. The patent owner could also receive the option of accepting a lesser amount. For example, if, after six months, only \$8 million was provided into the fund, the patent owner may accept that amount and enter those data into the smart contract and receive that money while having the processing occur for the patent.

The above approach can bring together the various parties in patent disputes and enable a process by which they can work together to provide a fair compensation for inventors while at the same time preventing excessive patent awards. Having stakeholders, including experts on valuation, can aid



*Evaluators can be ranked and receive a status that lets them mine a higher amount of patcoin for their efforts, commensurate with the amount they are trusted.*

in targeting appropriate settlement ranges. Evaluators can be ranked and receive a status that lets them mine a higher amount of patcoin for their efforts, commensurate with the amount they are trusted. The entity could keep a certain amount of the sale for its investors.

With all these confirmations in place, the money would be released to the inventor. Again, the money could be provided in the form of any one or more cryptocurrencies, held as a one-time-use payment token, or in any other fashion. The above approach could provide a more communal way of resolving high-value patent disputes without expensive litigation. This approach requires both parties to participate. A patent owner that requests \$2 billion in value is not likely to receive such a large sum.

However, had Jeff Bezos requested \$200 million to make Amazon's one-click purchasing patent open source in 1999 using the smart-contract approach described herein, many large companies—such as Apple (the only licensee of Amazon's one-click patent) and Barnes & Noble (which redesigned its payment process to be "two-click" to avoid infringement)—as well as many smaller companies would probably have contributed enough money to arrive at \$200 million, thereby benefitting from increased sales conversions on their respective websites. In this way, the trolls and the large companies could collaborate through a smart-contract blockchain or ICO approach.

## Supporting narrower blockchain innovation patents

The second aspect of this proposed solution is to support some of the more narrowly tailored innovations for blockchain-based companies. Take the beef blockchain example above. A promoted policy could provide guidance and suggestions to aid companies in protecting ideas, such as using the blockchain to provide public data on every cut of beef from birth to the butcher. The benefit of this aspect of the proposed campaign is to provide individual companies with a level of comfort, knowing that they can protect some portion of their intellectual capital so long as it is not foundational to the blockchain industry.

Ultimately, a significant predictor of a company's stance on foundational blockchain patents is the nature of the company itself. Companies providing services layered on top of blockchain technologies are more likely to favor patent minimalism in the blockchain space. A service business model thrives when there are plenty of products to layer on it. In contrast, an enterprise provider of blockchains might see blockchain technology, as Rosario Ingariola views it, as "something that scales better than anything ... seen in the marketplace ... that is something [it] absolutely want[s] to protect and benefit from."<sup>47</sup>

*Companies providing services layered on top of blockchain technologies are more likely to favor patent minimalism in the blockchain space.*



## Conclusions and recommendations

The current state of patent law presents some challenges to the blockchain ecosystem. Individuals and firms can implement techniques and strategies to increase the probability of successfully obtaining blockchain-based patents.

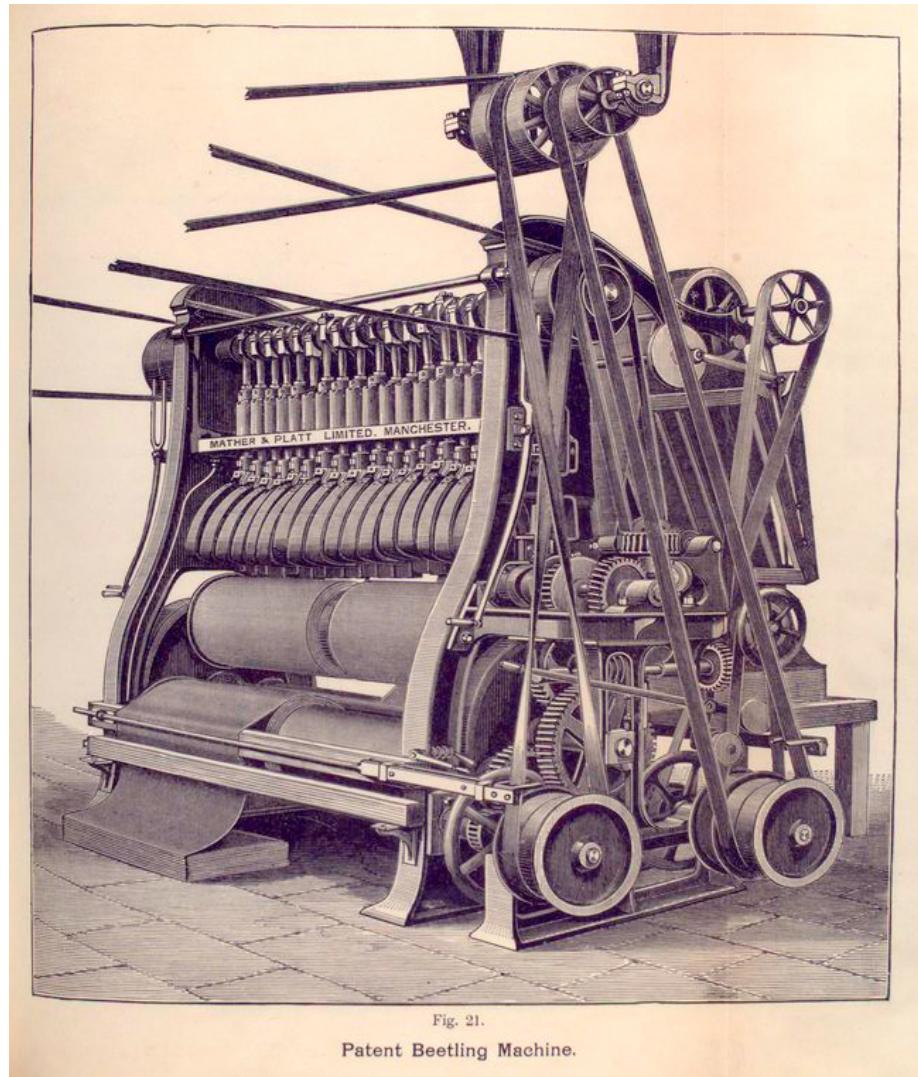
*The current state of patent law presents some challenges to the blockchain ecosystem.*

- ❖ To receive a grant, a blockchain patent application must meet three criteria—eligibility, novelty, and non-obviousness. The question of obviousness is rich and deep. Whether a new useful process based on blockchain technology is patent-eligible is not clear-cut. The courts do not favor existing business practices being implemented on generic computers.
- ❖ The more narrow and focused the claims are, the better the chances of getting claims allowed. The USPTO, for example, generally frowns on financial claims that appear to apply preexisting business practices to the Internet. The types of claims that can have a higher likelihood of being deemed patent-eligible are directed to improvements to existing technology, focused on creating or generating “new data” rather than merely collecting and analyzing existing data, and clearly not fundamental practices long prevalent in our system.
- ❖ A review of the patent landscape does reveal the potential issues that can arise. This research surfaced three strategies to avoid the blockchain patent land grab.
  - » The first strategy is patent pools, in which companies assign their patents to a consortium that is a trusted entity, and share the technology among the pool members or render it unenforceable. One drawback to this strategy is that it carries a risk of the pool abusing its leverage, creating antitrust concerns.
  - » A second strategy is the use of a blockchain-patent blockchain. Such a blockchain could be constructed to compensate innovators fairly for their inventions while still supporting and enabling the ecosystem to innovate without fear.
  - » The third strategy to avoid a land grab is voluntary communal coordination. This strategy allows patent holders to set a price for their patent that must be met before it is made public, and uses smart contracts to process the contributions of various interested parties toward meeting that price.



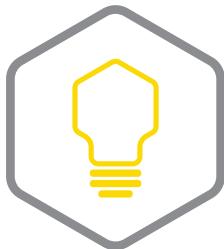
One recommended approach is to develop a blockchain-patent blockchain that can be developed with a wide base of consensus-building input to identify and establish truly essential patents in the blockchain space and literally on the blockchain. Such patent solutions can be implemented via an ICO or through a smart contract.

Voluntary communal coordination to release the technology held in valuable patents, facilitated via smart contracts, could compensate innovators in a fair manner commensurate with the market value of the innovations, while also disseminating those innovations throughout the ecosystem when the price has been reached. This strategy would also avoid unnecessary and expensive litigation, which can slow down the rollout of blockchain technologies.



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## About the author

Thomas M. Isaacson is a shareholder at Polsinelli PC. Previously, as in-house counsel at AT&T, Tom's responsibilities included client counseling, patent application preparation, patent prosecution, intellectual property strategy, managing outside counsel, litigation, opinion work, and licensing. Since starting his own practice in 2003, Tom has provided intellectual property counseling related to a variety of technologies including speech processing, cloud computing, and standards-based technologies such as MPEG4, 5G, LTE, and Wi-Fi. More recently, Tom has focused on network technologies, medical devices, and the blockchain, and he advises a number of firm clients that are actively developing blockchain-based technologies.

## Acknowledgments

Tom extends his thanks to Micah Kesselman and Clif Schlecht of Polsinelli PC for their assistance on this paper. He also acknowledges Perianne Boring, founder and president of the Chamber of Digital Commerce, for connecting the research team with Marc Kaufman at Rimon law and Questel. Marc was instrumental in the provision of data and the development of the figures used throughout this research report.

Marc Kaufman is a partner at the law firm of Rimon PC and concentrates his practice in the area of patent strategy—in particular, advising clients in protecting, managing, and monetizing their intellectual property assets. Marc specializes in the fintech space and is a co-chair of the Blockchain IP Council, an initiative of the Chamber of Digital Commerce focused on encouraging innovation in the blockchain ecosystem by addressing IP issues. Marc has partnered with Questel Inc. to develop the first exhaustive patent landscape in the blockchain ecosystem, the results of which are evident herein.

## Appendix

### '806 claim

The '806 claim 1 is as follows:<sup>48</sup>

A system for analyzing transactions in a distributed ledger, the system comprising one or more physical computer processors configured by machine-readable instructions to:



1. Identify compound transactions included in the distributed ledger, wherein the compound transactions include multiple addresses from which consideration is co-spent;
2. Determine the addresses from which consideration is co-spent in the identified compound transactions;
3. Associate the addresses involved in an individual one of the identified compound transactions with a grouping of addresses;
4. Identify the compound transactions wherein consideration is co-spent from an address associated with a first grouping of addresses and an address associated with a second grouping of addresses;
5. Determine whether the first grouping of addresses and the second grouping of addresses should be grouped or held separate based on grouping criteria, wherein the grouping criteria define events that justify grouping or holding separate the first grouping of addresses and the second grouping of addresses; and
6. Record potential grouping information based on the determination of whether the first grouping of addresses and the second grouping of addresses should be grouped or held separate, the potential grouping information indicating whether the first grouping of addresses and the second grouping of addresses should be associated with a first potential grouping.

## '829 claim

The '829 claim 1 is as follows:<sup>49</sup>

A method of securely storing data across a network in a multidimensional distributed database, said method comprising the steps of:

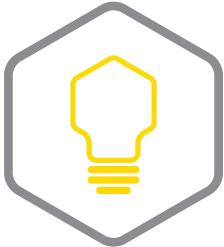
1. Generating a blockchain comprising linked data blocks, said blockchain being configured to propagate one or more branching blockchains, wherein any existing branching blockchain is configured to propagate one or more additional branching blockchains, wherein each of said branching blockchains has a fork block from which said one or more branching blockchains can grow in multiple directions thereby forming a multidimensional database known as a slidechain, wherein said growth occurs by adding new data blocks awarded each time a participating node in the network propagates an acceptable block with corresponding block hash, said fork block comprising a customizable set of protocols that define, for each block in said branching blockchain at least how block data are stored



and interpreted, how block validity is verified, how valid chain consensus is achieved, and criteria for generating a new block, wherein a copy of said slidechain is distributed to every node in the network, and said one or more new blocks are propagated when a node in the network provides a valid response to an algorithm along with proof of work for the valid response, wherein data stored in a block cannot be modified without invalidating all subsequent blocks, wherein generating said blockchain or branching blockchain includes:

2. Creating a root block payload to be included as part of a root block, wherein a root block comprises the root block payload and a root header;
3. Computing a root data hash from at least part of the root block payload;
4. Creating the root header comprising at least the root data hash, a root timestamp, a root cryptographic nonce, a root proof standard, and a root data descriptor;
5. Computing a short hash from inputs of at least said root data hash, said root timestamp, said root proof standard, and said root data descriptor;
6. Storing data as a fork block payload to be included as part of the fork block, wherein said fork block comprises a fork block payload, a fork header, and one or more authorized fork hashes;
7. Computing a payload hash from at least part of the fork block payload;
8. Creating a fork block header comprising at least said payload hash, a previous block hash, a payload timestamp, a payload cryptographic nonce, a payload proof standard, a fork block flag, and a payload data descriptor;
9. Storing said short hash in said fork block as said one or more authorized fork hashes;
10. Computing the fork header hash from inputs of at least said one or more authorized fork hashes, said payload hash, said previous block hash, said payload timestamp, said payload cryptographic nonce, said payload proof standard, said fork block flag, said payload data descriptor;
11. Storing said fork header hash as part of said root header; and
12. Computing a root header hash from inputs of at least said root data hash, said root timestamp, said root proof standard, said root data descriptor, said root cryptographic nonce, and said fork header hash.





## About the Blockchain Research Institute

Co-founded in 2017 by Don and Alex Tapscott, the Blockchain Research Institute is a knowledge network organized to help realize the new promise of the digital economy. It builds on their yearlong investigation of distributed ledger technology, which culminated in the publication of their critically acclaimed book, *Blockchain Revolution* (Portfolio|Penguin).

Our syndicated research program, which is funded by major corporations and government agencies, aims to fill a large gap in the global understanding of blockchain technology and its strategic implications for business, government, and society.

Our global team of blockchain experts is dedicated to exploring, understanding, documenting, and informing leaders of the market opportunities and implementation challenges of this nascent technology.

Research areas include financial services, manufacturing, retail, energy and resources, technology, media, telecommunications, healthcare, and government as well as the management of organizations, the transformation of the corporation, and the regulation of innovation. We also explore blockchain's potential role in the Internet of Things, robotics and autonomous machines, artificial intelligence, and other emerging technologies.

Our findings are initially proprietary to our members and are ultimately released under a Creative Commons license to help achieve our mission. To find out more, please visit [www.blockchainresearchinstitute.org](http://www.blockchainresearchinstitute.org).

### Leadership team

Don Tapscott – Co-Founder and Executive Chairman  
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Kirsten Sandberg – Editor-in-Chief  
Jane Ricciardelli – Director of Marketing  
Maryantonett Flumian – Director of Client Experience  
Luke Bradley – Director of Communications



## Notes

1. Benjamin Harrison, "Proclamation 311—Opening to Settlement Lands Acquired from the Sac and Fox Nation of Indians, Oklahoma Territory," 18 Sept. 1891, online by Gerhard Peters and John T. Woolley, *The American Presidency Project*. [www.presidency.ucsb.edu/ws/?pid=71014](http://www.presidency.ucsb.edu/ws/?pid=71014), accessed 18 Jan. 2018.
2. Rosario Ingariola, interviewed by author, 28 July 2017.
3. Jonathan Johnson, interviewed by author, 3 Oct. 2017.
4. Erik Voorhees, interviewed via telephone by author, 1 Aug. 2017.
5. For this paper, we will just discuss US law and note that other counties have their own standards for patentability, which are generally similar to those outlined herein.
6. Don Tapscott and Alex Tapscott, *Blockchain Revolution, How the Technology Behind Bitcoin is Changing Money, Business, and the World* (New York: Penguin Random House LLC, 2016).
7. "35 U.S. Code § 103: Conditions for Patentability; Non-Obvious Subject Matter," *Legal Information Institute*, Cornell Law School, n.d. [www.law.cornell.edu/uscode/text/35/103](http://www.law.cornell.edu/uscode/text/35/103), accessed 18 Jan. 2018.
8. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S.Ct. 2347 (2014). [www.supremecourt.gov/opinions/13pdf/13-298\\_7lh8.pdf](http://www.supremecourt.gov/opinions/13pdf/13-298_7lh8.pdf), accessed 6 Oct. 2017.
9. "35 U.S. Code § 101: Inventions Patentable," *Legal Information Institute*, Cornell Law School, n.d. [www.law.cornell.edu/uscode/text/35/101](http://www.law.cornell.edu/uscode/text/35/101), accessed 18 Jan. 2018.
10. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S.Ct. 2347 (2014), Slip Op., p. 9.
11. See *Alice*, 134 S.Ct. 2347, 2357.
12. "35 U.S. Code § 102: Conditions for Patentability; Novelty," *Legal Information Institute*, Cornell Law School, n.d. [www.law.cornell.edu/uscode/text/35/102](http://www.law.cornell.edu/uscode/text/35/102), accessed 18 Jan. 2018.
13. *Bilski v. Kappos*, 561 US 593 (2010). [www.supremecourt.gov/opinions/09pdf/08-964.pdf](http://www.supremecourt.gov/opinions/09pdf/08-964.pdf), accessed 6 Oct. 2017.
14. Steve Brachman, "Square fights off Alice rejection on payment transfer patent proving financial patents are not dead," *IPWatchdog*, IPWatchdog, Inc. 16 Sept. 2016. [www.ipwatchdog.com/2016/09/13/square-alice-payment-transfer-patent/id=72564](http://www.ipwatchdog.com/2016/09/13/square-alice-payment-transfer-patent/id=72564), accessed 11 Sept. 2017.
15. "What is Coinbase?" *Coinbase*, Coinbase, Inc., 23 Feb. 2017. [support.coinbase.com/customer/en/portal/articles/585625-what-is-coinbase](http://support.coinbase.com/customer/en/portal/articles/585625-what-is-coinbase), accessed 17 July 2017.
16. "What is Coinbase?" *Coinbase*, Coinbase, Inc., 23 Feb. 2017. [support.coinbase.com/customer/en/portal/articles/585625-what-is-coinbase](http://support.coinbase.com/customer/en/portal/articles/585625-what-is-coinbase); and "What is GDAX?" GDAX, 3 Aug. 2016. [support.gdax.com/customer/en/portal/articles/2424961-what-is-gdax-](http://support.gdax.com/customer/en/portal/articles/2424961-what-is-gdax-), both accessed 17 July 2017.
17. "Computer system for making a payment using a tip button," US 9436935 B2, www.google.ch/patents, 6 Sept. 2016. [www.google.ch/patents/US9436935](http://www.google.ch/patents/US9436935), accessed 18 Jan. 2018.
18. See *McRO, Inc. d/b/a Planet Blue v. Bandai Namco Games America, Inc.*, 120 USPQ2d 2019 (Fed. Cir. 2016). [www.cafc.uscourts.gov/sites/default/files/s15-1080.Opinion.9-9-2016.2.pdf](http://www.cafc.uscourts.gov/sites/default/files/s15-1080.Opinion.9-9-2016.2.pdf), accessed 18 Jan. 2018.
19. See *Electric Power Group, LLC v. Alstom S.A., Alstom Grid, Inc., Psymetrix, Ltd., Alstom Limited*, Case No. 2015-1778 (Fed. Cir. 2016). [www.cafc.uscourts.gov/sites/default/files/opinions-orders/15-1778.Opinion.7-28-2016.1.PDF](http://www.cafc.uscourts.gov/sites/default/files/opinions-orders/15-1778.Opinion.7-28-2016.1.PDF), accessed 18 Jan. 2018.
20. See *Intellectual Ventures II LLC v. Capital One Bank (USA), National Association, Capital One Financial Corporation, Capital One, National Association*, Case No. 2014-1506 (Fed. Cir. 2016). [www.cafc.uscourts.gov/sites/default/files/opinions-orders/14-1506.Opinion.7-1-2015.1.PDF](http://www.cafc.uscourts.gov/sites/default/files/opinions-orders/14-1506.Opinion.7-1-2015.1.PDF), accessed 18 Jan. 2018.
21. Samburaj Das, "'Bitcoin Creator' Craig Wright Lines up 70 Blockchain Patents," *CryptoCoinNews*, CCN.com, 2 March 2017. [www.ccn.com/bitcoin-creator-craig-wright-lines-up-70-blockchain-patents-backed-by-gambling-billionaire](http://www.ccn.com/bitcoin-creator-craig-wright-lines-up-70-blockchain-patents-backed-by-gambling-billionaire), accessed 25 Jan. 2018.
22. Samburaj Das, "'Bitcoin Creator' Craig Wright Lines up 70 Blockchain Patents."
23. Byron Kaye and Jeremy Wagstaff, "Bitcoin's 'creator' races to patent technology with gambling tycoon," *Reuters*, Thomson Reuters Corp., 2 March 2017. [www.reuters.com/investigates/special-report/bitcoin-wright-patents](http://www.reuters.com/investigates/special-report/bitcoin-wright-patents), accessed 10 July 2017.
24. This valuation is as of Feb. 2017.
25. UK Intellectual Property Office, [www.ipo.gov.uk](http://www.ipo.gov.uk).
26. See, e.g., Application No. GB1607584.8 lodged 29 April 2016, published 15 June 2016. [www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB1607584.8](http://www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB1607584.8), accessed 18 Jan. 2018.



27. Application No. GB1605032.0 lodged March 24, 2016, published 11 May 2016. [www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB1605032.0](http://www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB1605032.0), accessed 18 Jan. 2018.
28. Application No. GB1603125.4 lodged February 23, 2016, published 6 April 2016. [www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB1603125.4](http://www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB1603125.4), accessed 18 Jan. 2018.
29. Reuters, "These Investors Bought the Firm Behind Bitcoin's Self-Proclaimed Inventor," *Fortune*, Time, Inc., 13 April 2017. [fortune.com/2017/04/13/bitcoin-inventor-nchain](http://fortune.com/2017/04/13/bitcoin-inventor-nchain), accessed 11 Dec. 2017.
30. See 35 USC § 122, "Confidential status of applications; publication of patent applications," *Legal Information Institute*, Cornell Law School, n.d. [www.law.cornell.edu/uscode/text/35/122](http://www.law.cornell.edu/uscode/text/35/122), accessed 18 Jan. 2018.
31. See 35 USC § 122(b)(2)(B)(i); 37 CFR § 1.213, "Nonpublication request," *Legal Information Institute*, Cornell Law School, n.d. [www.law.cornell.edu/cfr/text/37/1.213](http://www.law.cornell.edu/cfr/text/37/1.213), accessed 18 Jan. 2018.
32. All patent filing data presented in Figures 1 through 4 are based on data compiled by Questel, Inc. and Rimon PC. With special thanks to Marc Kaufman of Rimon PC. Figures 1 – 4, copyright 2017 Questel, Inc. and Rimon PC.
33. WIPO is the World Intellectual Property Organization. International patent filings, such as via the Patent Cooperation Treaty (PCT), are managed by WIPO.
34. Figures 5 through 7 were generated using by AcclaimIP patent search software, copyright 2017 Polsinelli PC.
35. Defensive patent pools include RPX, Allied Security Trust, and Open Invention Network.
36. There is an analogous scenario to blockchain essential patents in gene-editing technologies. A group of patents have issued for CRISPR-Cas9 technology, which is a particular gene-editing approach. The patent owners engaged in a "surrogate" approach in which exclusive licensing rights to the patents were granted to a surrogate company. An effort was made by the US National Institute of Health to require patents in similar situations to core technologies and that utilized federal funding to be licensed non-exclusively. Read about this patent issue for gene-editing technology in "CRISPR, Surrogate Licensing, and Scientific Discovery," Jorge L. Contreras and Jacob S. Sherkow, *Science*, 17 Feb. 2017, Vol. 355, Issue 6326, downloaded 12 July 2017.
37. This language is drawn from an exchange with Don Tapscott of the Blockchain Research Institute and Simon Lee, a staff writer at Asia IP in Hong Kong.
38. See RPX Corporation website, [www.rpxcorp.com](http://www.rpxcorp.com).
39. There are many issues related to royalty rates that are not discussed herein. For example, dealing with potentially non-essential patents included within a pool and how to arrive at a fair price for a particular technology is a difficult problem. For an interesting discussion on patent pools in the context of cellular essential technologies, see Alfred, Joseph A., *Licensing Standards Essential Patents*, Licensing Executives Society (LES) international magazine les Nouvelles, Sept. 2017, p. 223.
40. See US20170177898, Summary. [www.google.com/patents/US20170177898](http://www.google.com/patents/US20170177898), accessed 18 Jan. 2018.
41. See US20170177898, Claim 1.
42. In the interest of full disclosure, the author of this article is a new member of the Chamber of Digital Commerce. [www.digitalchamber.org](http://www.digitalchamber.org).
43. 35 USC § 102(b)(1) states: "A disclosure made 1 year or less before the effective filing date of a claimed invention shall not be prior art to the claimed invention under subsection (a)(1) if—(A) the disclosure was made by the inventor or joint inventor or by another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor; or (B) the subject matter disclosed had, before such disclosure, been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor." This means that if inventors publish their own invention in the US, they have a one-year grace period in which to file a patent application.
44. See [github.com/search?utf8=%E2%9C%93&q=blockchain&type=](https://github.com/search?utf8=%E2%9C%93&q=blockchain&type=), accessed 6 Sept. 2017.
45. Erik Voorhees, interviewed via telephone by author, 1 Aug. 2017.
46. Erik Voorhees, interviewed via telephone by author, 1 Aug. 2017.
47. Rosario Ingariola, interviewed by author, 28 July 2017.
48. See patent, [www.google.ch/patents/US9298806](http://www.google.ch/patents/US9298806), accessed 12 Jan. 2018.
49. See patent, [www.google.com/patents/US9608829](http://www.google.com/patents/US9608829), accessed 12 Jan. 2018.







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