Stumbling blocks

Blockchain technology is increasingly being seen as applicable to various business fields. When proving infringement of blockchain claims, issues of decentralisation and extraterritoriality will be critical, explain **Frederick H Rein**, **Andrew E Riley**, and **Vi Tran**

While the rise of cryptocurrencies has highlighted the usefulness of blockchain technology, involving the creation of decentralised, electronic ledgers to track transactions, this technology is applicable to other fields, including financial services and pharmaceuticals. Contemporaneously, the number of pending US patent applications that incorporate blockchain technology has increased dramatically.[1] But questions remain regarding the patentability of blockchain claims in the US.

Others have noted potential issues with attempting to patent blockchains, including whether claims could survive a challenge under 35 USC section 101 in view of *Alice Corp Pty Ltd v CLS Bank Int'l*,[2] and its progeny.[3] Less has been written on whether those claims could be effectively asserted against a potential infringer, including whether multiple parties are implicated in the infringement analysis and whether extraterritorial activities factor in the infringement analysis.

What is a blockchain?

Generally, "blockchain" refers to a decentralised ledger, or record of transactions, where new entries are permanently added to an existing ledger upon solving an algorithmic problem.[4] As noted by other authors, a comparison to traditional documents illustrates some advantages of blockchains.[5] For a shared word processing file, each saved instance of the file is separate, independent, and editable. If the file becomes compromised, a backup must be used. If multiple people work on the "same" file, different versions may coexist. This type of file may not be ideal because of the risk of unwanted edits, uncontrolled versioning, and/or the file becoming compromised. Blockchain technology can

address these shortcomings.

A decentralised blockchain runs on a network, where each computer hosts an independent copy of the blockchain software that contains all the transactions that compose the blockchain ("nodes").[6] New entries are combined into groups called "blocks," which are added to the blockchain based on network consensus. The blocks in the ledger form an informational chain back to its generation – a "blockchain."[7] When a new block is broadcast to the network, parties work to solve an algorithmic problem, in a process called mining (for proof-of work algorithms).[8] Once the solution is found, each node updates to have the entire blockchain, including the new block, and the party that solves the algorithm is rewarded.[9]

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Because each node hosts the entirety of the blockchain (decentralisation), the entire network would have to go down to lose the information it contains. This decentralised architecture has a built-in fault tolerance that localised files do not. Furthermore, because the blockchain is not freely editable, versioning is not an issue. Thus, the issues raised above for traditional files are addressed by blockchain technology.

Are blockchains patentable?

As commenters have noted, there are open questions as to how to draft blockchain claims to survive a challenge under 35 USC section 101, particularly in view of the Supreme Court's *Alice* decision.[10] *Alice* sets forth a two-pronged test for patentability: is the claim at issue directed to a patent-ineligible concept? If so, do the claim's elements, considered both "individually and 'as an ordered combination' … 'transform the nature of the claim' into a patent-eligible application?"[11]

Abstract ideas alone, including mathematical algorithms, are not patent-eligible subject matter.[12] One way to overcome this barrier to patentability is to combine an algorithm with an inventive concept to transform the abstract idea into a patent-eligible application. *Alice*, 134 S Ct at 2357. Claims must "supply a 'new and useful' application of the idea in order to be patent eligible."[13] As the Federal Circuit has noted, "[i]n cases involving software innovations, this inquiry often turns on whether the claims focus on 'the specific asserted improvement in computer capabilities . . . or, instead, on a process that qualifies as an "abstract idea" for which computers are invoked merely as a tool.'"[14]

Because blockchains are, at their core, algorithms, claims to a blockchain alone may not be patentable. Applicants may, however, attempt to claim methods of using blockchains or systems that incorporate blockchains by combining the use of a decentralised blockchain (a "blockchain step" or "blockchain component") with an additional step or component (a "non-blockchain step" or "non-blockchain component"), such that the claim becomes patent eligible. The addition of the non-blockchain step or component must, however, sufficiently transform the claim as a whole into something patent-eligible to overcome a challenge under 35 USC section 101.[15]

Infringement of blockchain directed claims

Proving infringement of an issued claim to a method or system containing a blockchain step or component and a non-blockchain step or component may, however, be complicated. 35 USC section 271(a) states, "whoever without authority makes, uses, offers to sell, or sells any patented invention, within the US or imports into the US any patented invention during the term of the patent therefore, infringes the patent." A discussion of infringement under provisions of 35 USC section 271 other than section 271(a) is outside the scope of this article.

A threshold question for the infringement analysis is whether the claim is a process (method) claim or a system (device) claim, which will be taken in turn.[16]

"[A] process cannot be used 'within' the US as required by section 271(a) unless each of the steps is performed within this country."[17] As noted above, an advantage of blockchains is decentralisation. In a process claim that avoids problems with *Alice* by combining a blockchain step and a non-blockchain step, the decentralised blockchain step could be performed either domestically or abroad. If a step of a process claim is only performed abroad, it may not be possible to prove infringement under section 271(a).

Assuming all the steps of a process claim that combines a blockchain step and a non-blockchain step are performed in the US, the decentralised blockchain step may be performed by a different entity than the non-blockchain step, potentially giving rise to divided infringement. The Federal Circuit has ruled that "[w]here more than one actor is involved in practicing the steps [of a multi-step method claim], a court must determine whether the acts of one are attributable to the other such that a single entity is responsible for the infringement."[18] According to the Federal Circuit, an entity is responsible for others' performance of method steps "where that entity directs or controls others' performance…"[19] Such direction or control "includes circumstances in which an actor: (1) '*conditions* participation in an activity or receipt of a benefit' upon others' performance of one or more steps of a patented method, and (2) '*establishes the manner or timing* of that performance.'"[20] Thus, there may be divided infringement if one party exercises control over the performance of both steps or performs one step and exercises control over the performance of the other step.

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Alternatively, a patentee may look to assert system claims that contain a blockchain component. "The use of a claimed system under section 271(a) is the place at which the system as a whole is put into service, ie, the place where control of the system is exercised and beneficial use of the system obtained."[21] In *Centillion Data Sys, LLC v Qwest Communs Int'l Inc*, the Federal Circuit addressed infringement of a system claim through use where the system components were in the possession of more than one actor.[22] *Centillion* confirmed that NTP provides the proper analysis for infringement of a system claim, even when different actors possess separate elements of the system. Furthermore, "use" of a system claim requires that a potential infringer must benefit from all the elements of the claimed system, as opposed to the system as a whole.[23]

While proving "control of the system" for establishing infringement of a system claim may sound similar to *Akamai V's* test for whether an entity "directs or controls" others' performance of the steps of a method claim, these are separate tests. The Federal Circuit has declined to apply *Akamai V's* divided infringement framework to system claims.[24] At least one court has explicitly stated that "[t]he *Akamai [V]* framework does not apply to system claims, which are infringed where a party 'put[s] the invention into service…'"[25] Thus, for system claims, the infringement analysis should focus on whether the accused infringers exercise control over the system and whether the accused infringer obtains beneficial use of the system, even if different entities control different components of the system.

A blockchain component of a system could be located outside the US because it could exist anywhere a node exists. However, if an accused infringer exerts control over a system that uses a blockchain component from within the US (although the blockchain may exist abroad) and a benefit is obtained in the US from using the entire system (ie, both the blockchain component and the non-blockchain component), the existence of the blockchain component abroad would not preclude a finding of infringement.[26] In contrast, if an accused infringer does not exert control in the US over the system, then infringement might not be found, even if there is beneficial use in the US.

Out of the frying pan, into the fire?

Blockchain technology presents special challenges for US patent applicants. Due to the algorithmic nature of blockchains, obtaining a claim to a blockchain-enabled process or system that can withstand a section 101/*Alice* challenge may require a non-algorithmic step or component. But claiming a decentralised blockchain may make proving infringement more difficult.

Successful assertion of process claims that contain blockchain steps will require showing that all the steps are performed in the US. For a decentralised blockchain-step containing process, typically the process steps will be performed by different entities. To prove infringement, the patentee must establish that one party controlled or directed the performance of all steps of the claimed process.[27]

Alternatively, proving infringement of system claims that contain a blockchain component requires establishing that a party put the system into service and received beneficial use in the US.[28] In assessing the value of any potential claim, applicants should consider what must be proven to succeed in alleging infringement of blockchain-related claims.

> ## "Obtaining a claim to a blockchain-enabled process or system that can withstand a section 101/*Alice* challenge may require a non-algorithmic step or component."

Footnotes

1. Chuan Tian, The rate of blockchain patent applications has nearly doubled in 2017, Coindesk, (27 Jul 2017), https://goo.gl/yY3JfP, accessed 10 Jan 2018. All other URLs were accessed on the same date.
2. 573 US ___, 134 S Ct 2347 (2014).
3. Ira Schaefer & Ted Mlynar, Is a blockchain patent still possible?, Coindesk (15 Nov 2016), https://goo.gl/MBr6Ci ("Schaefer").
4. *See, eg,* Judd Bagley & Chris Evangelist, What is blockchain technology? A step-by-step guide for beginners, Blockgeeks, https://goo.gl/6vEAnS ("Bagley"); Mark van Rijmenam, What is the blockchain and why is it so important? https://goo.gl/m4d7JE, Linkedin.com (5 Sept 2016) ("van Rijmenam"); Collin Thompson, How does the blockchain work? https://goo.gl/kA8SJn, *The blockchain review* (2 Oct 2016).
5. Bagley, *supra* note 3.
6. Bagley, *supra* note 3; van Rijmenam, *supra* note 3.
7. Block chain, Bitcoinwiki, https://goo.gl/F7vuL, accessed 1/10/18; Blockchain, Wikipedia, https://goo.gl/Vuycpd.
8. See, *eg,* Proof of work, Bitcoinwiki, https://goo.gl/eeSmN; Proof-of-work system, Wikipedia, https://goo.gl/32B1Ko.
9. Bagley, *supra* note 3; van Rijmenam, supra note 3; The great chain of being sure about things? *The Economist* (31 Oct 2015), available at https://goo.gl/ZQALHa.
10. Schaefer, *supra* note 2; AlixPartners, *The race to patent the blockchain, Insight: financial advisory services,* 1, 5 (Sept 2016), https://goo.gl/KMhWpu; Sean McLeod, Intellectual property protection available to owners of blockchain technology, *Elon Business Law Journal,* (30 June 2017), https://goo.gl/uMAKB5; Who owns the blockchain? A rush to patent the blockchain is a sign of the technology's promise, *The Economist* (14 Jan 2017), available at https://goo.gl/N8wgBN; James Ching, Supreme Court's *Alice* Corporation Opinion Hookahs Patenting of Blockchain-Based Systems, law.com (3 Oct 2015), https://goo.gl/kRvvhK.
11. *Alice,* 134 S Ct at 2355.
12. See *Alice,* 134 S Ct. at 2354-55; *Bilski v Kappos,* 561 US 593, 611-613 (2010); *Diamond v Diehr,* 450 US 175, 185 (1981); *Parker v Flook,* 437 US 584, 594-595 (1978).
13. Id (citation omitted).
14. *Finjan, Inc v Blue Coat Systems, Inc,* 2018 WL 341882 at *2 (10 Jan 2018, Fed Cir) (quoting *Enfish, LLC v Microsoft Corp,* 822 F.3d 1327, 1335-36 (Fed Cir 2016).
15. See, eg, *RecogniCorp LLC v Nintendo Co,* 855 F.3d 1322, 1326-1327 (Fed Cir 2017) ("In confirming patentability, the Supreme Court focused not on the presence of a mathematical formula but on the subject matter of the claims as a whole."); *Amdocs (Israel) Ltd v Openet Telecom Inc,* 841 F.3d 1288, 1302 (Fed Cir 2016) ("[T]he claim [] involves limitations that when considered individually and as an ordered combination recite an inventive concept through the system's distributed architecture.").
16. See *NTP, Inc v Research In Motion, Ltd,* 418 F.3d 1282, 1317 (Fed Cir 2005) ("Under section 271(a), the concept of 'use' of a patented method or process is fundamentally different from the use of a patented system or device.").
17. Id at 1318. In finding no infringement under the sales prongs of section 271(a), the Federal Circuit stated in *NTP* that it "need not and do[es] not hold that method claims may not be infringed under the 'sells' and 'offers to sell' prongs of section 271(a);" however, it stated that infringement under the the prongs is construed narrowly. *NTP,* 418 F.3d at 1320-21. Referring to this analysis, the Federal Circuit found that the import prong of section 271(a) was also not met. Id. Because of the narrow, fact-specific nature of these bases for infringement we do not address them here.
18. *Akamai Techs, Inc v Limelight Networks, Inc,* 797 F.3d 1020, 1022 (Fed Cir 2015) ("*Akamai V*").
19. Id.
20. *Eli Lilly & Co v Teva Parenteral Medicines, Inc,* 845 F.3d 1357, 1365 (Fed Cir 2017) (citing *Akamai V,* 797 F.3d at 1023); see also *Travel Sentry, Inc v Tropp,* 877 F.3d 1370, 1383-84 (Fed Cir 2017).
21. NTP, 418 F.3d at 1317; see also *Finjan Inc v Sophos Inc,* 244 F.Supp.3d 1016, 1047-48 (ND Cal 2017) (applying NTP to direct infringement of a multinational system).
22. 631 F.3d 1279, 1284 (Fed Cir 2011).
23. See, eg, *Intellectual Ventures I LLC v Motorola Mobility LLC,* 870 F.3d 1320, 1329 (Fed Cir 2017).
24. See, eg, *Lyda v CBS Corp,* 838 F.3d 1331, 1339 (Fed Cir 2016); *Centrak, Inc v Sonitor Technologies, Inc,* CA No. 14-183-RGA, 2017 WL 3730617 at *6 (30 Aug 2017, D Del).
25. *Raptor LLC v Odebrecht Construction Inc,* CA No. 17-21509, 2017 WL 3776914 at *3 (31 Aug 2017, SD Fla).
26. See, eg, *NTP,* 631 F.3d at 1284; *Centillion,* 631 F.3d at 1284.
27. See, eg, *Akamai V,* 797 F.3d at 1022.
28. See, eg, *NTP,* 631 F.3d at 1284; *Centillion,* 631 F.3d at 1284.

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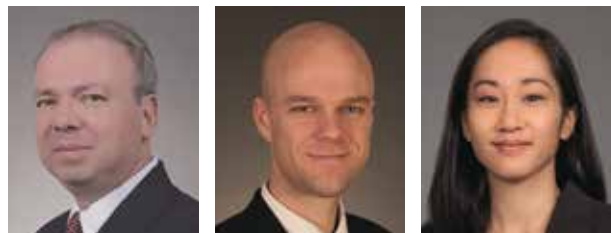
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