



Talking about a new revolution: blockchain

Conference report
4 December 2018 | The Hague





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Preliminary note

This report has been published as a follow-up to the “Patenting Blockchain” conference held at the EPO in The Hague on 4 December 2018. It is the first time one of the five largest patent offices has held such an event to discuss blockchain’s impact on the patent system. It attracted over 300 representatives from industry, academia, user associations, patent law firms, the judiciary, national patent offices and government bodies from 35 different countries. It provided a unique opportunity to openly exchange views and to raise awareness of:

- The different types of blockchain and the technical jargon
- Future opportunities and challenges
- How to combine open source and patents
- What litigation might look like
- How EPO examiners search for and examine blockchain patents
- Views from Chinese, Japanese and US patent professionals

The programme included presentations and panel discussions, followed by question and answer sessions. This report provides a summary and reproduces the various speakers’ ideas and opinions. They do not necessarily represent the views of the EPO.

Over 300 participants from around the world attended the conference.

Introduction

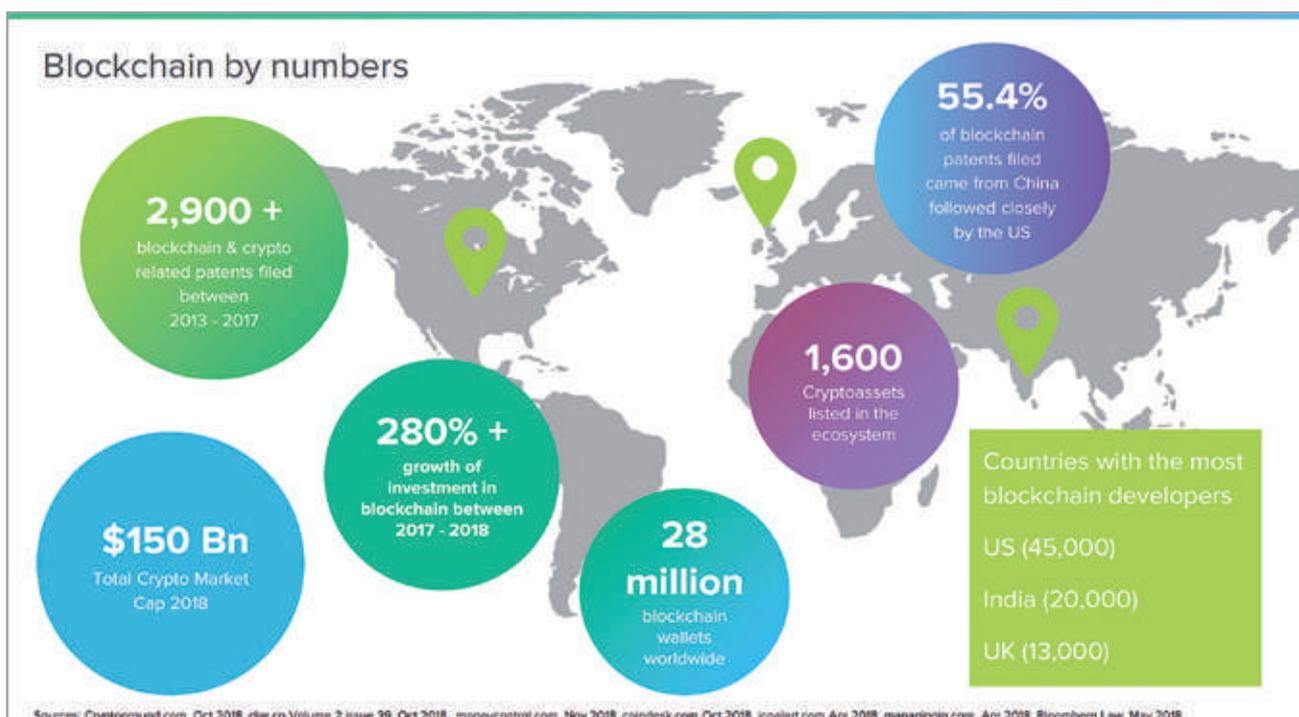
We are standing on the cusp of a revolution, the fourth industrial revolution in fact. And blockchain, as one of the technologies driving the changes, is at its forefront.

You might not even be aware of it, but blockchain technology is gradually appearing everywhere. This technology was at first largely put to use in the financial services industry but by now has found multiple applications in other industries, including static registry, identity, smart contracts, dynamic registry and payment infrastructure.

Core blockchain concepts can be found in cryptography, hashing, distributed storage, consensus mechanisms and countermeasures to tampering. Applied blockchain, meanwhile, is used in business methods, supply chain management, coin-free apparatus, wireless applications, patient monitoring and access to patient data, vehicle theft prevention and car sharing.

Blockchain technology, by now all-pervasive, is driving growth in patent applications.

It comes as no surprise that its potential is now driving steep growth in patent applications. Although a relatively recent phenomenon, there are already about 4 000 patent families related to blockchain in the world. These are mostly in China and the US.



Source: Circle

A confounding number of questions and sometimes contradictory conclusions have accompanied this technology. Not least, what is blockchain, how can it be used and is it really as big as people think it is? How disruptive will it be for the intellectual property rights (IPR) landscape? What impact will the technology have on various industry sectors worldwide in the future?

We have already lived through web 1.0 and 2.0, which was about data, information, media and communication. Web 3.0, meanwhile, led by blockchain, is all about governance, trust and sharing value.

What actually is blockchain?

Blockchain can be seen as a database that is shared across a network of computers. Fundamentally, blockchain adds a new, additional layer to the internet's infrastructure.

Blockchain technology forms the backbone of a new type of internet.

“Public blockchains provide an open, global, immutable and incorruptible record keeping, transaction and secure computation systems,” explained Marieke Flament, chief marketing officer at mobile payment company Circle.

The technology comprises a distributed ledger where data is not changeable. This has massive implications in, say, the healthcare sector, where patient data is highly sensitive. Here, blockchain can record who looks at data, when and why.

In terms of recordkeeping, the technology is certainly game-changing: instead of having just one database, you can fall back on different servers and nodes. This makes it much more robust. It also provides a secure computation system in terms of transactions. And if, as is being mooted, in time everything in the world is going to be digitalised, this means that every digital contract will take place on the blockchain.

Was not all of this possible before, you may ask? Obviously beforehand you could send an email or an image but you would keep a copy of that email or image and the person you sent it to would also keep a copy. The fundamental paradigm shift is that blockchain allows you to do this in a decentralised fashion without having to trust the other person.

USE CASES

To illustrate blockchain technology, let us look at a couple of concrete examples of how it is currently being applied.

One use case is Verisart. This is one of the first platforms to help artists authenticate their work on the blockchain. It was set up to prove the authenticity of a work of art in the art market, which is plagued by large transaction fees and tight regulations. Using Verisart, artists can control the number of copies of their work available and register their own copyright and provenance information. Thanks to smart contracts and tokenization, blockchain also reduces the transaction cost of selling their work.

Ariane, meanwhile, plans to protect physical possessions and hinder the increased counterfeiting of luxury goods and piracy activity. Using a smart link, Ariane connects the asset with the brand, owner, retailer and insurance company, alongside any other stakeholders, thereby securing the network of stakeholders and closing the gap for counterfeiters.





António Campinos, EPO

What about blockchain and patenting?

Of course, the patent landscape needs to develop in tandem with this growing technology.

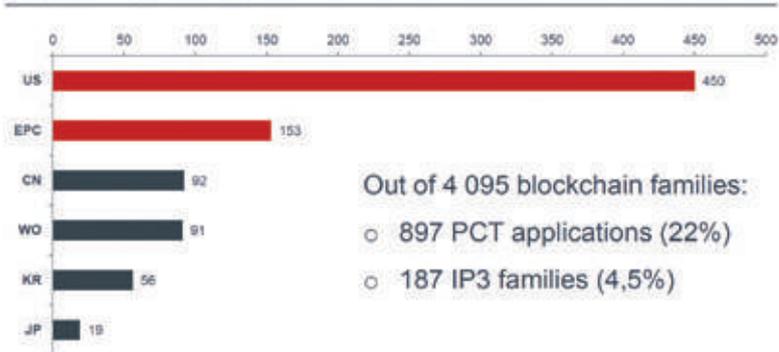
Not surprisingly, patent applications for blockchain are rising sharply and the number of filings is expected to grow even further, said António Campinos, President, EPO. “We cannot tell with absolute certainty how this technology and patenting landscape is going to evolve in the future. It is true that the number of filings is relatively small compared with other technologies but we can anticipate growth in the future. What we can do is prepare for the trends and changes we are seeing now.”

The statistics are telling: the number of patent families filed and granted globally has risen from zero in 2008 to 2 200 patent applications in 2018. Out of these, 40% include a patent application filed in China (2 048) and 20% include a patent application filed in the US (1 234), revealed Yann Ménière, chief economist at the EPO.



Towards global blockchain families

Origin (first filing) of PCT applications



Out of 4 095 blockchain families:

- 897 PCT applications (22%)
- 187 IP3 families (4,5%)

European Patent Office

4

Top blockchain applicants at EPO and worldwide

Top applicants worldwide

Worldwide Applicants	Patent families
IBM (US)	111
ALIBABA (CN)	88
COINFLUG (KR)	88
BOE TECHNOLOGY (CN)	61
MASTERCARD (US)	51
BANK OF AMERICA (US)	46
CHINA UNICOM (CN)	46
NCHAIN (GB)	45
VISA (US)	41
FUZAMEI TECHNOLOGY (CN)	36

Top applicants EP

EP Applicants	Patent families
VISA (US)	16
MASTERCARD (US)	14
SIEMENS (DE)	12
ACCENTURE (IE)	10
NOKIA (FI)	9
NCHAIN (GB)	7
SONY (JP)	7
BT (GB)	6
GEMALTO (NL)	6
NEC (JP)	6

Top 10 applicants by patent families

European Patent Office

5

So how are patent professionals navigating this changing landscape?

Blockchain technology promises to accelerate the patenting process.

Blockchain remains a young technology, both from a legislation and a patenting perspective. To realise its potential, it clearly needs space to grow. “When litigation starts way too early then sometimes technology does not blossom,” pointed out Benjamin Bai, Vice President and chief IP counsel of Ant Financial Services Group, which operates Alipay, the world’s largest online and mobile payments platform.

What is important to remember is that this technology could also benefit patenting and licensing processes on a global scale. It could, for instance, reduce administration and speed up the patenting and licensing process. Potentially, blockchain could also lead to practically incorruptible evidence of an IP trail, help in avoiding duplication and ease management of royalties through micro-payments, automated transaction and real-time monitoring.

Blockchain can help in particular regarding entitlement issues and any necessary transactions, whereas artificial intelligence can help assess the value of a patent and in the search of prior art.



From left to right: Mirko Böhm (Open Inventor Network), Benjamin Bai (Ant Financial), Michael Fröhlich, moderator (EPO), Richard Bennett (SSM Patent Attorneys), Klaus Haft (Hoyng Rokh Monegier)

Is blockchain just open source territory?

“We have to remember that blockchain emerged originally as an open source technology, where the source code is made available for further modifications and as a collaborative effort,” said Mirko Böhm from Open Invention Network (OIN).

For Böhm, open source provides transparency, accessibility, replicability and the absence of central authority for public blockchains. For private blockchains, we need to develop the means to allow the necessary transparency, he continued.

Blockchain's core technology should be accessible to all.

While blockchain's core technology should remain open to all, patenting makes sense where value can be added. In other words, patenting should occur in the higher layers of the stack. Klaus Haft, attorney-at-law at Hoyng Rokh Monegier, added that open source does not mean patent-free.

Let's talk about infringement and litigation risks

Blockchain technology needs to take off before any litigation for infringement materialises. For the patent owner, it may be difficult to prove infringement, as the algorithms are usually not disclosed, the cryptology is complex and reverse engineering is not available.

Patent attorney Richard Bennett from SSM Patent Attorneys noted that industries can converge, such as information and communication technology and financial services. He added that legal standards need to be defined when consumers are affected.

In view of the collaborative landscape, issues could arise for the truly disruptive patent, such as the one solving the problem of cross-chain communication, where there are not yet any effective post-grant mechanisms of control in place. Mechanisms should be developed so that such a patent gets the value it deserves, but not more. Patent offices contribute by objecting to claims that are too broad or by raising objections of lack of clarity. Haft welcomed the way that the EPO increasingly cites prior art from the internet.



Koen Lievens, EPO

What is the EPO doing about it?

Europe has witnessed a marked upturn in blockchain patent filing starting in 2015, with more than two thirds taking place at the EPO.

The main technology fields where most applications have been filed so far are payment architecture, schemes or protocols (728), followed by cryptographic mechanisms or arrangements for secret or secure communications (447).

For example, IBM holds an existing patent for the creation of a way in which to store encrypted data on a blockchain. MasterCard International, meanwhile, holds a patent for a method of tracking payments and uploading data onto a blockchain at point of sale.

Amid all the uncertainty surrounding this unfolding technology, the EPO is currently acting like the calm in the storm by providing a consistent, stable and legally robust approach. “I am pleased to say that our ability to examine blockchain patent applications in a predictable manner is well-established,” said Koen Lievens, director in Information and Communications Technology (ICT), EPO.

After all, as Lievens points out, blockchain inventions are essentially computer-implemented inventions (CII), so they are examined by the EPO according to

established stable criteria, developed in accordance with CII case law. “Realising that blockchain inventions are in fact CII is a big relief,” said Lievens. “We are on known territory. We know how to do this. Applicants will have legal certainty and will get what they expect.”

Blockchain inventions = Computer Implemented Inventions

Business methods	Payments, transactions, supply chain management, business models in energy
Networking	P2P, cloud, client-server, routing, broadcast
Security	Cryptography, prevent tampering
Mathematics	Hashing, Crypto puzzle
Databases	Data structures, synchronisation
Computing	Racks and grids, speed and power issues
Medical apps	Record keeping
AI	Training, federated learning
Program	S/w implementation, micro-contracts
Xxxx	Xxxx

European Patent Office 4

TELL ME ABOUT CII

CII is considered patentable in Europe provided that the invention provides a technical solution to a technical problem. The inventions also need to meet the legal requirements of novelty, inventiveness and industrial application. Computer programmes “as such” are not patentable under the European Patent Convention (EPC).

Core to the EPO’s approach are the examination guidelines, which have been revised thoroughly and are updated every year, taking into account the guidance offered by Board of Appeal decisions, as well as feedback from user groups, said Lievens. “These guidelines are binding for examiners and help us provide as much clarity as possible to our applicants. Predictability is very important, as is a consistent approach.” The section of the examination guidelines relating to CII is highlighted in an index.

So who does what? A strategic CII steering committee defines the CII strategy overall and steers CII examiner networks. A CII guidelines working group writes guidelines based on case law, fostering harmonisation across technical fields and sectors. Then come the EPO examiners, who follow the documented practice and have to take decisions on each individual case. All examiners receive CII training and in each directorate one or two examiners are trained to be CII experts to act as the first-line contact person for all CII-related questions. The central CII guidelines drafting group, with over 20 experts, provides second-line support.

The examiners' role

When it comes to examining patents, it is important to know that blockchain-based patent applications, like any CII-patent application, may only be patented if the invention provides a technical solution to a technical problem.

These technical problems may relate to the underlying technologies, such as cryptography or networks, or may be found in blockchain's application to such diverse application fields as logistics or medicine.

How do examiners address this? First of all, after they receive a blockchain patent application, they perform a search. At their disposal is the world's largest collection of documents, with 1.3 billion records of patent and non-patent literature in 179 databases, the dedicated EPOQUE search tool, and the Cooperative Patent Classification (CPC) system for classifying patent documents. Highly qualified, specialised examiners then add value to the data searching process, said Georg Weber, operational director in ICT, EPO. The examiners use a variety of search terms in several different languages. They also carry out internet searches in blogs, forum discussions and open source information.

The next step is to follow a well-established approach to assessing technicality. Before granting a patent, an invention has to pass two tests as part of a



two-hurdle approach. The first test is the so-called eligibility approach: is there an invention and is there some technical aspect involved? If it is about business methods and is abstract, then the invention usually has to be excluded from patentability. Since blockchain employs cryptographic methods, all blockchain-related patent applications will pass this test and are therefore eligible for patentability.

The second and more demanding test involves examining the application as to novelty and inventive step, where examiners attempt to divide the technical from the non-technical features of a claim. Those parts making no technical contribution cannot contribute to inventive step.

What about elsewhere?

As well as ensuring consistency internally, it is important for the EPO to agree upon a harmonised approach with its international partners.

“As technology becomes more global and with 5G global communication standards, it is becoming more important to make patent protection consistent across the world,” said the EPO’s Mènière.

While the EPO’s practice is regarded as a benchmark within the industry, comparative and bilateral studies help partners assess and understand each other’s approach. There is alignment among partners: the Chinese, for instance, are particularly aligned with the European approach. Differences remain, however, particularly when it comes to legislation. There are more hardware requirements in Japan, for instance, while the Chinese place a lot of emphasis on exceptions to patentability.



Wang Xinyi, CNIPA

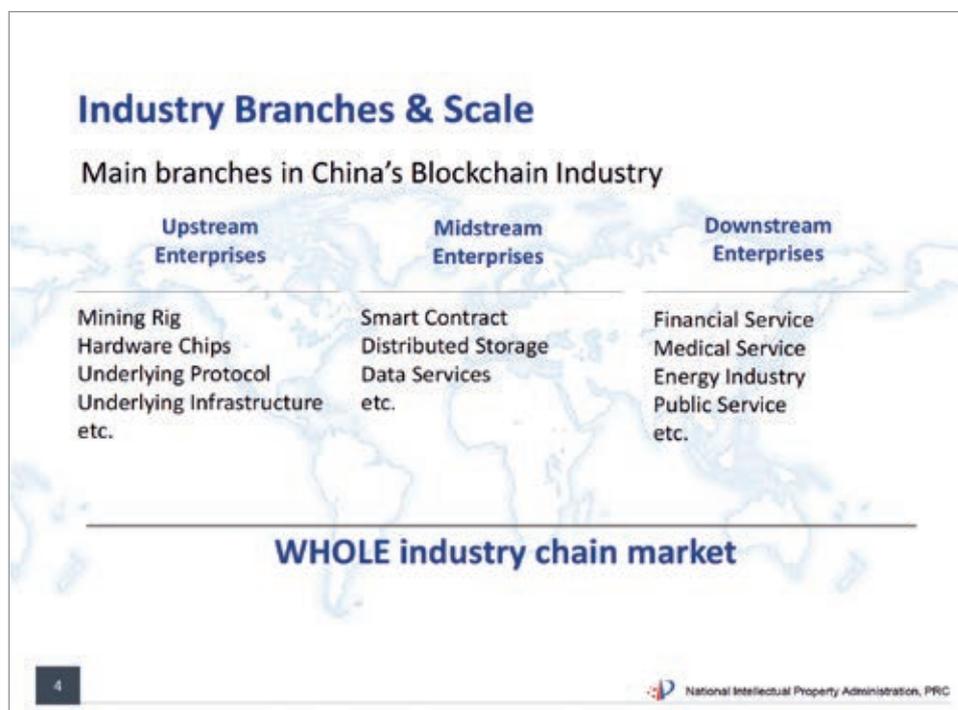
What about China?

The blockchain market in China is booming. According to Wang Xinyi, expert patent examiner at the Chinese Patent Office (CNIPA), it is estimated that, by 2020, the market size of China’s blockchain industry will be 10 billion yuan (1.3 billion euros).

In 2017, blockchain was the domain of start-ups in China, but as of 2018 some giant IT and telecommunication companies began to get involved. By the end of 2018, 3 401 patent applications had been published in China. Of these, 125 have already been granted, continued Wang. Commercial use led the way, with 1 411 applications, followed by communications, with 1 097 filings.

The main applicants in China for blockchain-related patent applications are Alibaba Group Holding Ltd., with 108 patent applications, followed by China Unicom Group Co Ltd. with 75 applications.

The technology is expected to be largely utilised by the financial sector in China, followed by electronic deposit, internet services, patient privacy and the charity sector.



Allow or reject? Patentability in China

When it comes to patentability in China, it is often a case of “same but different”. There are a lot of resemblances between Chinese and European patent law concerning blockchain. But there are differences, too, in examination practice, and these can lead to dramatic differences in the decision reached.

China has a similar approach to Europe regarding blockchain patentability.

China is almost on the same page as the EPO when it comes to the subject-matter for which a patent can be granted: it must have a technical solution, have technical means and solve technical problems. One difference, however, is in the area of exclusions from patentability. Bitcoin, for instance, is not allowed in any financial institutions in China as this may lead to instability in the financial markets and is therefore deemed detrimental to the public interest.

“Currently, the only legal currency in China is the bank note and I don’t see that changing in the near future,” said Wang.

So what about some concrete examples? Wang firstly referred to a patent application using blockchain for financial purposes. This featured a multilayer blockchain clearing method where a father chain is connected with a sub-chain for issuing, transferring and recording virtual money transactions. As it included a pure algorithm method it could not be patented.

A technical improvement in the blockchain is allowed under the law though. For example, Wang mentioned a method for realising shared retail based on blockchain for establishing and maintaining network nodes and providing an application programming interface at a protocol layer. As this clearly involves technical solutions and technical means it is allowed.

In future, Wang expects more input from universities and research institutes, working with the government. These have the power to research the underlying technology of blockchain for patent applications. They can also establish a useful standard for regulating development and security levels, as well as other aspects of blockchain.

In summary, though, Wang sees blockchain patentability in China as “nothing special”. After all, it uses the same law and methods as elsewhere, she remarked.



Nobuyuki Taniguchi,
Nakamura and Partners

What about Japan?

Japan is also experiencing growth in blockchain patent applications.

As elsewhere, in Japan the number of applications for blockchain-related patents is rising, namely from 40 in 2014 to over 90 in 2017. The major applicant categories include computer electronics makers, bank system integrators and start-ups.

In essence, the Japanese approach to CII practice often differs to that used by the EPO or elsewhere, although in many cases the outcome remains the same, said Nobuyuki Taniguchi, patent attorney and partner for Nakamura and Partners.

What is notable about Japan is that many patent applicants have utilised the accelerated examination scheme to obtain blockchain-related patents: about one in four applications are already under the accelerated examination scheme for applications filed in 2016.

Furthermore, blockchain patents, even for business applications, can be obtained much more easily in Japan than in other jurisdictions. Both technical differences and also non-technical differences are considered when evaluating inventive step, so it is not so difficult to draft a claim in such a manner that you can fulfil the requirement of inventive step, said Taniguchi.

“I imagine that blockchain applications for business applications will rapidly be increasing. That maybe raises the question how to deal with the non-technical feature in the claims in every jurisdiction.”

Finally, computer program claims are also admissible in Japan, where patent law stipulates that an invention includes a program or “other information equivalent to programs”. Structured data claims can therefore also be used for Bitcoin and for smart contract patent applications if they are equivalent to programs.



From left to right: Jon Wright (Sterne Kessler), Erich Spangenberg (IPwe), James Nurton, moderator, Benoît Abeloos (EC), Mareike Flament (Circle)

What does the future look like for blockchain?

If you look back at trends in the industry, then 2002 was all about IP rules for email and 2012 was about patenting smart phones. And 2022 is set to see an increase in blockchain-related patents because of the innovation that this technology offers.

Standardisation is an important step but should not take place too early.

Despite the investment made in blockchain so far, there is still much work to be done with regards to regulation, infrastructure and mass adoption. Erich Spangenberg, CEO and founder of IPwe, a company that uses blockchain to create patent assets, underlined that a very low percentage of patents have market value. Therefore, he continued, patents show a very low return on investment: namely 2-5%, according to statistics from the World Intellectual Property Organisation (WIPO).

For many, standardisation is the first big step. The earlier we introduce standards, then the easier it is going to be to adopt technology, so the logic goes. At the same time, we need to progress cautiously: rules should not hinder progress.

“It is a balance between seeing what is the next thing coming and what is going on right now,” said Flament. “If we had regulated the internet too early then we might not have seen some of the players.”

The European Commission is actively examining ways to work with blockchain.

Benoît Abeloos, senior policy officer in the digital innovation and blockchain unit of DG Connect at the European Commission, also advocates a softly-softly approach. “The Commission is clear that we need to let innovation happen and need not regulate too quickly. We need to monitor innovation and let the technology mature before thinking about regulation.”

The Commission, currently analysing the legal aspects of blockchain implementation, sees potential in becoming “a trailblazer in the way we use it to manage government services”, continued Abeloos. Initiatives include a blockchain partnership, where the Commission has invited member states to sign a voluntary partnership to look at a possible European-wide blockchain services infrastructure. Elsewhere, a joint research centre is undertaking studies on blockchain. And within the Commission itself, there is a dedicated team examining blockchain’s potential and possibilities.

Other challenges ahead

To continue to make progress, we need to clearly define various aspects of blockchain. Take smart contracts, another hot topic of the moment. These contracts could be important in areas where the chronology of ownership is crucial, for example, with a patent or with transactions where you do not trust the central authority, such as in a country with a failing government.

Currently, though, even the definition of smart contracts remains an oxymoron, explained Jon Wright, director in Sterne Kessler’s Trial & Appellate and Electronics Practice Groups. “One simple definition of a smart contract is that it is an agreement in digital form that is self-executing and self-enforcing. Most definitions do not take into account the legal aspects of a contract. But they are certainly not smart if they are self-executing and self-enforcing. Plus it is not a contract either because you are typically not taking into account the legal aspects.”

Bai, meanwhile, sees technical challenges ahead before blockchain can translate into financial success. For example, there currently is not any viable technology to allow chain-to-chain communications, or crosschain communication. “First, there has to be huge commercial value generated by blockchain, regardless of the hype. If fundamental bottlenecks aren’t solved then we are not going to see any benefits. We have seen some commercialisation of blockchain but it is nothing like the smartphone industry so I think we have a lot more to do.”

Effective harmonisation is a further key hurdle. The beauty of blockchain is that it is completely cross-border and truly a global technology. Nevertheless, determining what IPR you need on a global basis can be tricky and costly, said Claire Wells, legal and business affairs director for Europe, Circle. “Multiple jurisdictions have different interpretations of what certain assets or technology might be classified as and until we get harmonisation, then regulation will be arbitrary, essentially with people deciding to file their patents in a particular



Claire Wells, Circle

Harmonisation would help applicants understand drafting requirements.

jurisdiction where it might be easier to do so or where their assets might be interpreted in a particular jurisdictional light. So harmonisation on the patenting process and on the actual taxonomy of what we are talking about would be helpful.”

Gabriele Mohsler, Vice President Patent Development, IPR and Licensing, Ericsson, would also welcome greater harmonisation: “Otherwise it is quite challenging for an applicant to understand what is needed.” For her, drafting a good application that will later on hold up in court if necessary is the greatest challenge right now. Notably, she does not see any need to change the patent laws.

For many, infrastructure urgently needs to be improved before blockchain’s full potential is unleashed. For a start, a lot of electricity is used in mining when cracking cryptographic problems. Transactions take too much time: compare Visa with 1 667 transactions per second with Bitcoin with four transactions per second. And many different blockchains do not necessarily speak to each other. There is also the cost aspect: how much should blockchain cost?

Then there is the topic of timing as regards patenting. Blockchain technology is moving forward incredibly quickly yet the patenting process takes much longer. “If the process takes a few years and requires a number of team members to help with the process, it can be quite limiting,” said Wells. “If you cannot patent the underlying technology, it can be quite a hard pedal to actually prove innovation in this space.”

At the end of day, to progress we need to grant patents that have meaning in the marketplace, said Mohsler. Companies need to focus their blockchain development on something that can be commercialised; otherwise it all does not make sense.



Gabriele Mohsler, Ericsson



Summary

Blockchain is undoubtedly complex and many questions remain unanswered. That said, we need to start thinking of its implications for society and the patenting world, while knowing that we might not yet have the answers. By talking now, we can reach a common understanding of the challenges ahead.

Blockchain's potential is huge and the innovation's application could be almost unlimited. Many speakers indicated that they expect further developments in the years to come and in a wider range of fields, such as government services.

Challenges may lie ahead but the EPO is well prepared. It provides legal certainty at every level thanks to the high quality of its staff, services and tools. Furthermore, the EPO remains fully committed to treating blockchain patent applications according to its well-established practice for CII.

We are at the beginning of a new revolution. Blockchain started in the financial sector, but it is spreading to all fields of industrial application. The best is yet to come.

The EPO treats blockchain patent applications in line with its practice for CII.



Annexes

What is Bitcoin?

In 2008, an unknown person (or possibly a group of people) called Satoshi Nakamoto authored a white paper called “Bitcoin: A Peer-to-Peer Electronic Cash System”. This internet-based monetary system enabled online payments without a third party and without a government or corporate entity backing it.

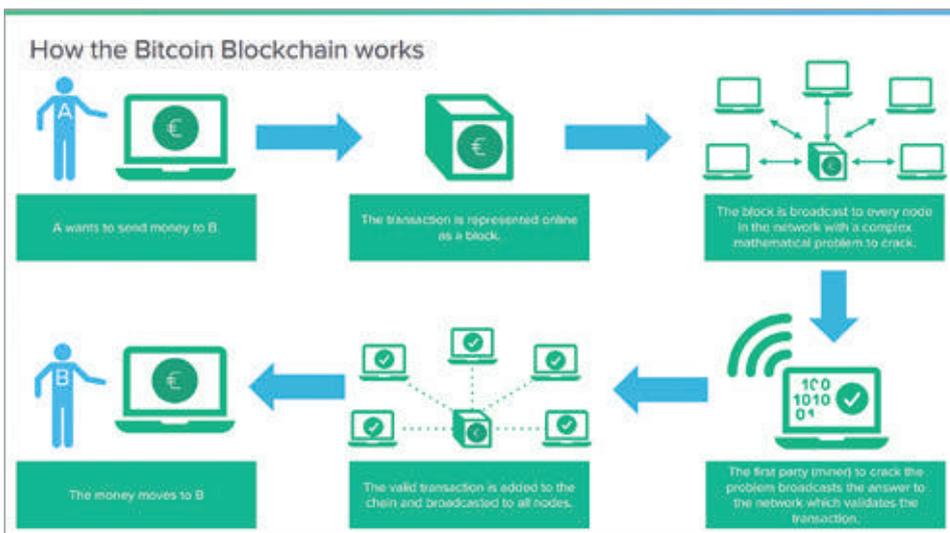
So how does Bitcoin work? When you are talking about physical cash, it is quite simple. If A wanted to give money to B, A would hand that money over and not have it anymore, explained Flament.

If you introduce that concept to the digital world without any intermediary, then A sends money to B, B gets the cash but A still has a copy. Centralised digital cash introduces C, a bank, into the equation. C is then trusted to credit B and debit A.

With decentralised digital cash or Bitcoin, miners updating the blockchain replace C. In this instance, if A wants to send money to B, A actually broadcasts to the blockchain that they want to carry out that transaction. The transaction is represented online as a block. The block is broadcast to every node in the network with a complex mathematical problem to crack. The first party or miner to crack the problem broadcasts the answer to the network, which validates the transaction and adds it to its central ledger. And the money moves to B.



Bitcoin was the first crypto asset ever invented and as such triggered the birth of blockchain as a concept. But today, it's not just about Bitcoin anymore. Blockchain has gone way beyond that.



Source: Circle

Getting to grips with the vocabulary

New technology is often accompanied by confusing vocabulary. And there is certainly a lot of jargon pervading the blockchain world. Here we get to grips with some of the main terms, as described by Wells.

Miners

Firstly, there are “miners”, namely people who invest computational power into cracking a problem in return for a reward. Many are based in China. As the activity involves a lot of computer power, a major aspect of their work is finding the cheapest source of electricity available. They often have to strike a tricky balance between power and speed: how much electricity to use versus how fast they can solve a problem. As Flament pointed out, Bitcoin mining consumes 0.13% of the world’s energy annually and is on track to consume as much as Denmark by 2020.

Public key **Private key**

When someone sends you cryptocurrencies over the blockchain, they are actually sending them to a hashed version of what is known as the “public key”. There is another key, which is hidden from them, known as the “private key”.

Custodians

The role of “custodians” is to store private keys and facilitate their management. Ultimately a Bitcoin is a long private key. If you lose that key, it is lost forever so it needs to be kept in a safe place.

Wallets **Exchanges** **Compare sites**

“Wallets” allow individuals to store cryptocurrencies. “Exchanges” are digital marketplaces, where traders can buy and sell cryptoassets. Meanwhile, “compare sites” provide live streaming of crypto prices alongside the market capitalisation of all cryptocurrencies.

Public blockchain **Private blockchain**

And then there is “public blockchain”, where anyone can read, write or audit the chain, versus “private blockchain”, which is owned by an individual or organisation.

Centralised networks **Decentralised networks**

In a similar vein, “centralised networks” rely on a higher authority to make decisions and approvals whereas a “decentralised network” is a spread network, distributing the information and authority.

Open source **Proprietary software**

The term “open source” refers to software whose source code is freely available on the internet. “Proprietary software”, in contrast, is protected by copyright and is licensed or sold.

Forking

Another important concept in the blockchain world is “forking”, when within communities people start disagreeing and decide to create two different versions.

Proof of work

“Proof of work” (PoW) is the original consensus algorithm in a blockchain network and is used to confirm transactions and add new blocks to the chain.

Proof of stake

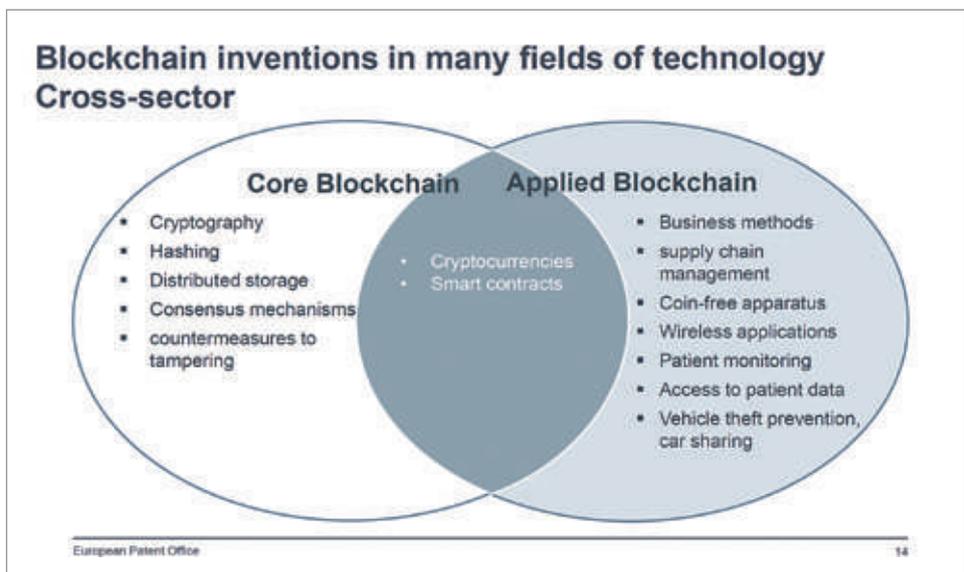
“Proof of stake” (PoS) is a different process for verifying transactions, which is several thousand times more cost effective and energy efficient than PoW, as each miner can only mine or validate block transactions according to how many they hold.

Tokenization

Last but certainly not least, there is “tokenization”. This is a method that converts some form of asset into a token that can be moved, recorded, or stored on a blockchain system. In other words, tokenization converts the value stored in some object into a token that can be manipulated along a blockchain system. “We believe you can tokenize anything of value. So you could represent your watch, your car or your identity in tokenized form,” said Wells.

Tokenization has the power to disrupt a number of different industries, including finance, accounting, insurance, law, systems for governance and anything to do with recordkeeping, such as contracts and certification. There are a number of functions and applications within those industries. One is the recordkeeping side of things, namely static information, such as patent information. The other is transactions, a dynamic registry that updates as assets, such as royalty payments, are exchanged on the digital platform.

Why does it matter? Wells maintained that the tokenisation of everything would have a huge socio-economic impact, allowing for greater levels of transparency and accountability and above all, greater levels of global integration. “It will provide the ability to share value globally, between people, businesses and society as a whole.” In this way, corruption within our current systems can be eradicated.



For further information, please visit
epo.org/blockchain2018



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