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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD

Proceeding	87766205
Applicant	Diamond Offshore Drilling, Inc.
Applied for Mark	BLOCKCHAIN DRILLING
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Submission	Appeal Brief
Attachments	Applicant Ex Parte Appeal Brief BLOCKCHAIN DRILLING.pdf(113019 bytes) Appeal Exhibit A U.S Registration No. 2505798.pdf(19157 bytes) Appeal Exhibit B U.S Registration No. 1252181.pdf(19486 bytes) Appeal Exhibit C Wikipedia Definition of Blockchain.pdf(501428 bytes) Appeal Exhibit D Wikipedia Definition of Well Drilling.pdf(334460 bytes) Appeal Exhibit E U.S. Registration No. 5512311.pdf(48651 bytes) Appeal Exhibit F Track ICO for use of Blockchain Hotels.pdf(262545 bytes)
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Date	09/27/2019

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BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD

Serial No.	87766205
Mark:	BLOCKCHAIN DRILLING
Applicant:	Diamond Offshore Drilling, Inc.
Examining Attorney:	David A. Hoffman

APPLICANT'S *EX PARTE* APPEAL BRIEF

COMES NOW Applicant Diamond Offshore Drilling, Inc. and hereby respectfully appeals the Examining Attorney's refusal to register Applicant's standard character BLOCKCHAIN DRILLING mark in Application Serial No. 87766205 (the "Application"). The Examining Attorney has refused registration of Applicant's mark on the grounds that Applicant's BLOCKCHAIN DRILLING mark is merely descriptive of the applied-for services, *inter alia*, utilizing blockchain technology and solutions during the drilling of offshore oil and gas wells, pursuant to Trademark Act § 2(e)(1), 15 U.S.C. § 1052(e)(1). Applicant believes that its mark is suggestive, not merely descriptive, and therefore requests that the statutory refusal be reversed.

PROSECUTION HISTORY

Applicant filed the Application on January 23, 2018, seeking registration on the Principal Register for the mark BLOCKCHAIN DRILLING in connection with "Drilling of offshore oil or gas wells utilizing blockchain technology and solutions to enhance efficiencies and reduce costs" in International Class 037 and for "Implementation of blockchain technology and solutions, namely, providing a non-downloadable cloud-based computer software platform to enhance efficiencies and reduce costs in drilling offshore oil and gas wells" in International Class 042.

On May 17, 2018, the Examining Attorney issued a Non-Final Office Action, refusing registration under Trademark Act Section 2(e)(1) on the ground that Applicant's mark is merely descriptive of Applicant's services. Applicant filed a response on November 19, 2018, in which Applicant offered arguments and evidence against the refusal. On January 8, 2019, the Examining Attorney issued a Final Office Action regarding the refusal under Trademark Act Section 2(e)(1).

On July 3, 2019, Applicant filed a Request for Reconsideration after Final Office Action asserting additional arguments that the applied for mark is not merely descriptive of the services.

On July 29, 2019, the Examining Attorney denied Applicant's Request for Reconsideration and maintained and continued the merely descriptive refusal.

SUMMARY OF EVIDENCE

Exhibit A	U.S. Registration No. 2505798
Exhibit B	U.S. Registration No. 1252181
Exhibit C	Screenshot of Wikipedia Definition of Blockchain, https://en.wikipedia.org/wiki/Blockchain
Exhibit D	Screenshot of Wikipedia Definition of Well Drilling, https://en.wikipedia.org/wiki/Well_drilling
Exhibit E	U.S. Registration No. 5512311
Exhibit F	Screenshot of Track ICO for use of BLOCKCHAIN HOTELS, https://www.trackico.io/ico/blockchain-hotels/#team

ARGUMENT

The Examining Attorney has refused registration of Applicant's mark, BLOCKCHAIN DRILLING, pursuant to Trademark Act Section 2(e)(1), 15 U.S.C. § 1052(e)(1), on the basis that the mark is merely descriptive of the applied-for-services in International Classes 037 and 042. The examining attorney argues that Applicant's mark does not create a unique, incongruous or nondescriptive meaning.

Applicant submits that the mark is not merely descriptive of the services, but instead that the mark is suggestive. There is often a "thin line of demarcation between suggestive and a merely descriptive designation." *In re Americh Corporation*, 2001 WL 286129, *2 (TTAB Mar. 22, 2001). "A mark is descriptive if it forthwith conveys an immediate idea of the ingredients, qualities or characteristics of the goods [or services]." *Id.* quoting *Abercrombie & Fitch Co. v. Hunting World, Inc.*, 537 F.2d 4, 189 USPQ 759, 765 (2nd Cir. 1976) (emphasis in original). To the contrary, "A suggestive mark requires imagination, thought and perception to reach a conclusion

as to the nature of the goods [or services] . . . ." *StonCor Grp., Inc. v. Specialty Coatings, Inc*., 759 F.3d 1327, 111 USPQ2d 1649, 1652 (Fed. Cir. 2014).

The mark BLOCKCHAIN DRILLING is suggestive in that blockchain is traditionally used in ledgers, accountant's records, and in other secure data storage systems. Oil and gas well drilling, on the other hand, is a rough and tumble, messy and dangerous endeavor—rendering well drilling incongruous with back office accounting in a safe office environment. As a result, a consumer familiar with the oil and gas industry would not immediately understand what services BLOCKCHAIN DRILLING conveys. Instead, it takes imagination—and thought and perception—to reach an understanding as to the specific nature of the services; specifically, how blockchain could relate to the drilling of an oil well. The consumer's multi-stage reasoning process would require consideration of BLOCKCHAIN, and its surrounding meaning, then consideration of DRILLING, and what drilling an oil and gas well entails, and then the consideration of how the two could apply to one another in order to understand the association of the combined terms to the services. That is the core of a suggestive mark.

1. TTAB Decisions Demonstrate BLOCKCHAIN DRILLING is Not Merely Descriptive.

Analysis of Trademark Trial and Appeal Board decisions related to trademarks that were initially refused as merely descriptive is instructive here. For example, the history of AIRBATH, U.S. Registration No. 2505798, for "baths in which water and air are introduced simultaneously into the baths to provide the retention of water in the baths and the formation of air bubbles at the surface of the water" is analogous. *See* Exhibit A. AIRBATH was initially refused registration on the basis that it was merely descriptive because, according to the examining attorney, the mark immediately indicates that applicant's goods "incorporate the use of 'air' in its bathtub or uses 'air' when the purchaser is taking a bath." *In re Americh Corporation*, 2001 WL 286129 at *1 (TTAB

Mar. 22, 2001). The Board disagreed and reversed the refusal to register finding that the mark was suggestive. *Id.* at *2.

The Board agreed with applicant that the combination of the words "air" and "bath" results in an incongruous designation that does not "convey an immediate quality about the goods with any degree of particularity." Id. at *2. In other words, consumers would not understand what the product named AIRBATH describes, despite their understanding of the words air and bath. The same is true for BLOCKCHAIN DRILLING. Consumers may have an idea of what both "blockchain" and "drilling" mean, but the two words are not ordinarily paired together, and this incongruous combination renders consumers unsure what services are being offered in connection with the BLOCKCHAIN DRILLING mark.

Second, the mark SNO-RAKE for "a snow removal hand tool having a handle with a snow-removing head at one end, the head being of solid uninterrupted construction without prongs" is informative. SNO-RAKE was initially refused registration by the examining attorney as merely descriptive. *See In re Shutts*, 217 U.S.P.Q. 363, 1983 WL 51780, *1-2 (Feb. 25, 1983). In that case, the examining attorney argued the mark was descriptive of applicant's goods in that the product was intended to be used to rake snow from automobile windshields and similar surfaces. *Id.* at 1. The Board disagreed, and found that the mark was suggestive because SNO-RAKE does not readily and immediately evoke an impression and understanding of the applicant's snow removal device. *Id.* The Board stated that "the idea of a 'rake' or 'raking' does indeed sit strange in terms of application to snow and, at best, is suggestive of a capacity for gathering up snow with an implement or using an action that hardly fits any of the common conceptions of 'rake' or 'raking.'" *Id.* at 2. The Board therefore reversed the refusal to register and ordered that the mark be published for opposition. *Id.* at 3; *see* Exhibit B.

The Board's reasoning with the SNO-RAKE mark is apropos here. BLOCKCHAIN DRILLING does not readily and immediately evoke an impression and understanding of Applicant's oil and gas drilling services, even if consumers understand blockchain technology and oil and gas well drilling. Blockchain is readily understood by the public as a "growing list of records, called blocks, that are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data." *See* Exhibit C. Blockchain, by design, is resistant to modification of data, and once recorded, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks. *Id.* Consumers' concept of this blockchain technology is typically associated with keeping data secure, such as with ledgers and back office accounting.

On the other hand, consumers understand well drilling to be "the process of drilling a hole in the ground for the extraction of a natural resource such as ground water, brine, natural gas, or petroleum." *See* Exhibit D. Consumers will not readily be able to connect how technology designed to keep data secure relates to the drilling of a boring in the Earth designed to bring hydrocarbons to the surface. That is the incongruity of Applicant's mark. Because the idea of "blockchain" sits strange in terms of application to drilling an oil and gas well, the mark is suggestive, as it does not fit any of the common conceptions of how blockchain is used. Based on the foregoing, Applicant's mark is not merely descriptive of Applicant's services offered in connection therewith. *See, also, In re Tennis in the Round, Inc*., 199 U.S.P.Q. 496 (1978) (TENNIS IN THE ROUND not merely descriptive of a special type of tennis facility having a circular configuration of tennis courts; *Minnesota Min. & Mfg. Co. v. Johnson and Johnson*, 172 USPQ 491 (1972) (SKINVISIBLE not merely descriptive for transparent medical adhesive tape);

Reynolds Metals, Co., 178 USPQ 296 (CCPA 1973) (BROWN-IN-BAG not merely descriptive for transparent plastic film cooking bags useable in browning meats).

2. Third Party Registration Demonstrates BLOCKCHAIN DRILLING Is Not Merely Descriptive.

Although the presence of third party registrations is not conclusive on the question of descriptiveness, it is relevant and persuasive in this instance. According to the examining attorney, both "blockchain" and "drilling" merely describe a significant feature, and/or the common commercial name of Applicant's services. Yet, that argument is belied by other blockchain marks on the Principal Register. For example, the mark BLOCKCHAIN HOTELS is registered on the principal register in International Class 43 for "Hotel, restaurant and bar services." *See* Exhibit E. BLOCKCHAIN HOTELS is used in connection with hotels where "guests can live, work, and play while they travel, and sell or lease high-quality hospitality accommodations using our proprietary cryptocurrency Hotel Coin. A Blockchain Hotel not only serves as an innovative world class hotel with inherent real estate value, but is also a huge contributor to the global nomads and accepts transactions for dozens of blockchains." *See* Exhibit F. The mark, therefore, is used in connection with hotels that utilize blockchain technology.

Using the examining attorney's reasoning, BLOCKCHAIN HOTELS merely describes a significant feature and/or the common commercial name of applicant's services. Yet, BLOCKCHAIN HOTELS was registered on the Principal Register without any office action. That is because consumers do not readily associate blockchain technology with hotels and the providing of hotel, restaurant, and bar services. Applicant's mark, BLOCKCHAIN DRILLING, is no different.

For these reasons, the mark BLOCKCHAIN DRILLING does not merely describe Applicant's services. Applicant respectfully requests that the Section 2(e)(l) rejection be withdrawn and that the application be passed to publication.

24059240v.1

Int. Cl.: 11

Prior U.S. Cls.: 13, 21, 23, 31 and 34

Reg. No. 2,505,798

United States Patent and Trademark Office

Registered Nov. 13, 2001

TRADEMARK
PRINCIPAL REGISTER

AIRBATH

AMERICH CORPORATION (CALIFORNIA CORPORATION)
13212 SATICOY STREET
NORTH HOLLYWOOD, CA 916053404

FOR: BATHS IN WHICH WATER AND AIR ARE INTRODUCED SIMULTANEOUSLY INTO THE BATHS TO PROVIDE FOR THE RETENTION OF WATER IN THE BATHS AND THE FORMATION OF AIR BUBBLES AT THE SURFACES OF THE WATER, IN CLASS 11 (U.S. CLS. 13, 21, 23, 31 AND 34).

FIRST USE 12-0-1998; IN COMMERCE 12-0-1998.

SER. NO. 75-713,764, FILED 5-25-1999.

HYUN OH, EXAMINING ATTORNEY

Int. Cl.: 8

Prior U.S. Cl.: 23

United States Patent and Trademark Office

Reg. No. 1,252,181

Registered Sep. 27, 1983

TRADEMARK

Principal Register

SNO-RAKE

Carl V. Shutts (United States citizen), d.b.a. Shuttsco
3154 Heavilin Rd.
Valparaiso, Ind. 46383

For: A SNOW REMOVAL HAND TOOL HAVING A HANDLE WITH A SNOW REMOVING HEAD AT ONE END, THE HEAD BEING OF A SOLID UNINTERRUPTED CONSTRUCTION WITHOUT PRONGS, in CLASS 8 (U.S. Cl. 23).

First use Dec. 3, 1979; in commerce Dec. 3, 1979.

Ser. No. 245,440, filed Jan. 8, 1980.

A. D. HOOKS, Examining Attorney

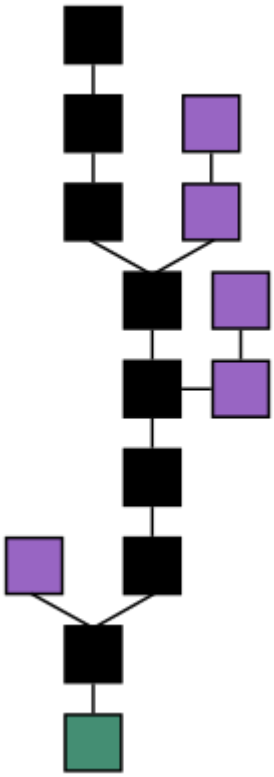
WIKIPEDIA

Blockchain

A **blockchain**,[1][2][3] originally **block chain**,[4][5] is a growing list of records, called *blocks*, that are linked using cryptography.[1][6] Each block contains a cryptographic hash of the previous block,[6] a timestamp, and transaction data (generally represented as a Merkle tree).

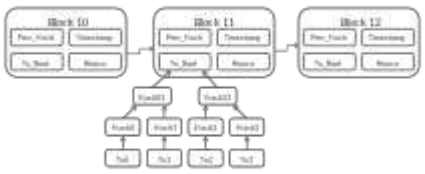
By design, a blockchain is resistant to modification of the data. It is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way".[7] For use as a distributed ledger, a blockchain is typically managed by a peer-to-peer network collectively adhering to a protocol for inter-node communication and validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks, which requires consensus of the network majority. Although blockchain records are not unalterable, blockchains may be considered secure by design and exemplify a distributed computing system with high Byzantine fault tolerance. Decentralized consensus has therefore been claimed with a blockchain.[8]

Blockchain was invented by a person (or group of people) using the name Satoshi Nakamoto in 2008 to serve as the public transaction ledger of the cryptocurrency bitcoin.[1] The identity of Satoshi Nakamoto is unknown. The invention of the blockchain for bitcoin made it the first digital currency to solve the double-spending problem without the need of a trusted authority or central server. The bitcoin design has inspired other applications,[1][3] and blockchains that are readable by the public are widely used by cryptocurrencies. Blockchain is considered a type of payment rail.[9] Private blockchains have been proposed for business use. Sources such as *Computerworld* called the marketing of such blockchains without a proper security model "snake oil".[10]



Blockchain formation. The main chain (black) consists of the longest series of blocks from the genesis block (green) to the current block. Orphan blocks (purple) exist outside of the main chain.

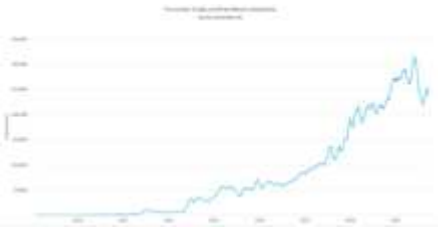
Contents



Bitcoin network data

History

The first work on a cryptographically secured chain of blocks was described in 1991 by Stuart Haber and W. Scott Stornetta.[6][11] They wanted to implement a system where document timestamps could not be tampered with. In 1992, Bayer, Haber and Stornetta incorporated Merkle trees to the design, which improved its efficiency by allowing several document certificates to be collected into one block.[6][12]



Bitcoin transactions (January 2009 – September 2017)

The first blockchain was conceptualized by a person (or group of people) known as Satoshi Nakamoto in 2008. Nakamoto improved the design in an important way using a Hashcash-like method to timestamp blocks without requiring them to be signed by a trusted party and to reduce speed with which blocks are added to the chain.[6] The design was implemented the following year by Nakamoto as a core component of the cryptocurrency bitcoin, where it serves as the public ledger for all transactions on the network.[1]

In August 2014, the bitcoin blockchain file size, containing records of all transactions that have occurred on the network, reached 20 GB (gigabytes).[13] In January 2015, the size had grown to almost 30 GB, and from January 2016 to January 2017, the bitcoin blockchain grew from 50 GB to 100 GB in size.

The words *block* and *chain* were used separately in Satoshi Nakamoto's original paper, but were eventually popularized as a single word, *blockchain,* by 2016.

Smart contracts that run on a blockchain, for example, ones that "creat[e] invoices that pay themselves when a shipment arrives or share certificates that automatically send their owners dividends if profits reach a certain level".[1] require an off-chain oracle to access any "external data or events based on time or market conditions [that need] to interact with the blockchain".[14]

According to Accenture, an application of the diffusion of innovations theory suggests that blockchains attained a 13.5% adoption rate within financial services in 2016, therefore reaching the early adopters phase.[15] Industry trade groups joined to create the Global Blockchain Forum in 2016, an initiative of the Chamber of Digital Commerce.

In May 2018, Gartner found that only 1% of CIOs indicated any kind of blockchain adoption within their organisations, and only 8% of CIOs were in the short-term "planning or [looking at] active experimentation with blockchain".[16]

Structure

A blockchain is a decentralized, distributed, and oftentimes public, digital ledger that is used to record transactions across many computers so that any involved record cannot be altered retroactively, without the alteration of all subsequent blocks.[1][17] This allows the participants to verify and audit transactions independently and relatively inexpensively.[18] A blockchain database is managed autonomously using a peer-to-peer network and a distributed timestamping server. They are authenticated by mass collaboration powered by collective self-interests.[19] Such a design facilitates robust workflow where participants' uncertainty regarding data security is marginal. The use of a blockchain removes the characteristic of infinite reproducibility from a digital asset. It confirms that each unit of value was transferred only once, solving the long-standing problem of double spending. A blockchain has been described as a *value-exchange protocol*.[20] A blockchain can maintain title rights because, when properly set up to detail the exchange agreement, it provides a record that compels offer and acceptance.

Blocks

Blocks hold batches of valid transactions that are hashed and encoded into a Merkle tree.[1] Each block includes the cryptographic hash of the prior block in the blockchain, linking the two. The linked blocks form a chain.[1] This iterative process confirms the integrity of the previous block, all the way back to the original genesis block.[21]

Sometimes separate blocks can be produced concurrently, creating a temporary fork. In addition to a secure hash-based history, any blockchain has a specified algorithm for scoring different versions of the history so that one with a higher score can be selected over others. Blocks not selected for inclusion in the chain are called orphan blocks.[21] Peers supporting the database have different versions of the history from time to time. They keep only the highest-scoring version of the database known to them. Whenever a peer receives a higher-scoring version (usually the old version with a single new block added) they extend or overwrite their own database and retransmit the improvement to their peers. There is never an absolute guarantee that any particular entry will remain in the best version of the history forever. Blockchains are typically built to add the score of new blocks onto old blocks and are given incentives to extend with new blocks rather than overwrite old blocks. Therefore, the probability of an entry becoming superseded decreases exponentially[22] as more blocks are built on top of it, eventually becoming very low.[1][23]:ch. 08[24] For example, bitcoin uses a proof-of-work system, where the chain with the most cumulative proof-of-work is considered the valid one by the network. There are a number of methods that can be used to demonstrate a sufficient level of computation. Within a blockchain the computation is carried out redundantly rather than in the traditional segregated and parallel manner.[25]

Block time

The *block time* is the average time it takes for the network to generate one extra block in the blockchain. Some blockchains create a new block as frequently as every five seconds. By the time of block completion, the included data becomes verifiable. In cryptocurrency, this is practically when the transaction takes place, so a shorter block time means faster transactions. The block time for Ethereum is set to between 14 and 15 seconds, while for bitcoin it is 10 minutes.

Hard forks

A *hard fork* is a rule change such that the software validating according to the old rules will see the blocks produced according to the new rules as invalid. In case of a hard fork, all nodes meant to work in accordance with the new rules need to upgrade their software.

If one group of nodes continues to use the old software while the other nodes use the new software, a split can occur. For example, Ethereum has hard-forked to "make whole" the investors in The DAO, which had been hacked by exploiting a vulnerability in its code. In this case, the fork resulted in a split creating Ethereum and Ethereum Classic chains. In 2014 the Nxt community was asked to consider a hard fork that would have led to a rollback of the blockchain records to

mitigate the effects of a theft of 50 million NXT from a major cryptocurrency exchange. The hard fork proposal was rejected, and some of the funds were recovered after negotiations and ransom payment. Alternatively, to prevent a permanent split, a majority of nodes using the new software may return to the old rules, as was the case of bitcoin split on 12 March 2013.[26]

Decentralization

By storing data across its peer-to-peer network, the blockchain eliminates a number of risks that come with data being held centrally.[1] The decentralized blockchain may use ad-hoc message passing and distributed networking.

Peer-to-peer blockchain networks lack centralized points of vulnerability that computer crackers can exploit; likewise, it has no central point of failure. Blockchain security methods include the use of public-key cryptography.[4]:5 A *public key* (a long, random-looking string of numbers) is an address on the blockchain. Value tokens sent across the network are recorded as belonging to that address. A *private key* is like a password that gives its owner access to their digital assets or the means to otherwise interact with the various capabilities that blockchains now support. Data stored on the blockchain is generally considered incorruptible.[1]

Every node in a decentralized system has a copy of the blockchain. Data quality is maintained by massive database replication[8] and computational trust. No centralized "official" copy exists and no user is "trusted" more than any other.[4] Transactions are broadcast to the network using software. Messages are delivered on a best-effort basis. Mining nodes validate transactions,[21] add them to the block they are building, and then broadcast the completed block to other nodes.[23]:ch. 08 Blockchains use various time-stamping schemes, such as proof-of-work, to serialize changes.[27] Alternative consensus methods include proof-of-stake.[21] Growth of a decentralized blockchain is accompanied by the risk of centralization because the computer resources required to process larger amounts of data become more expensive.[28]

Openness

Open blockchains are more user-friendly than some traditional ownership records, which, while open to the public, still require physical access to view. Because all early blockchains were permissionless, controversy has arisen over the blockchain definition. An issue in this ongoing debate is whether a private system with verifiers tasked and authorized (permissioned) by a central authority should be considered a blockchain.[29][30][31][32][33] Proponents of permissioned or private chains argue that the term "blockchain" may be applied to any data structure that batches data into time-stamped blocks. These blockchains serve as a distributed version of multiversion concurrency control (MVCC) in databases.[34] Just as MVCC prevents two transactions from concurrently modifying a single object in a database, blockchains prevent two transactions from spending the same single output in a blockchain.[35]:30–31 Opponents say that permissioned systems resemble traditional corporate databases, not supporting decentralized data verification, and that such systems are not hardened against operator tampering and revision.[29][31] Nikolai Hampton of *Computerworld* said that "many in-house blockchain solutions will be nothing more than cumbersome databases," and "without a clear security model, proprietary blockchains should be eyed with suspicion."[10][36]

Permissionless

The great advantage to an open, permissionless, or public, blockchain network is that guarding against bad actors is not required and no access control is needed.[22] This means that applications can be added to the network without the approval or trust of others, using the blockchain as a transport layer.[22]

Bitcoin and other cryptocurrencies currently secure their blockchain by requiring new entries to include a proof of work. To prolong the blockchain, bitcoin uses Hashcash puzzles. While Hashcash was designed in 1997 by Adam Back, the original idea was first proposed by Cynthia Dwork and Moni Naor and Eli Ponyatovski in their 1992 paper "Pricing via Processing or Combatting Junk Mail".

Financial companies have not prioritised decentralized blockchains.

In 2016, venture capital investment for blockchain-related projects was weakening in the USA but increasing in China.[37] Bitcoin and many other cryptocurrencies use open (public) blockchains. As of April 2018, bitcoin has the highest market capitalization.

Permissioned (private) blockchain

Permissioned blockchains use an access control layer to govern who has access to the network.[38] In contrast to public blockchain networks, validators on private blockchain networks are vetted by the network owner. They do not rely on anonymous nodes to validate transactions nor do they benefit from the network effect. Permissioned blockchains can also go by the name of 'consortium' blockchains.[39]

Disadvantages of private blockchain

Nikolai Hampton pointed out in *Computerworld* that "There is also no need for a '51 percent' attack on a private blockchain, as the private blockchain (most likely) already controls 100 percent of all block creation resources. If you could attack or damage the blockchain creation tools on a private corporate server, you could effectively control 100 percent of their network and alter transactions however you wished."[10] This has a set of particularly profound adverse implications during a financial crisis or debt crisis like the financial crisis of 2007–08, where politically powerful actors may make decisions that favor some groups at the expense of others,[40][41] and "the bitcoin blockchain is protected by the massive group mining effort. It's unlikely that any private blockchain will try to protect records using gigawatts of computing power — it's time consuming and expensive."[10] He also said, "Within a private blockchain there is also no 'race'; there's no incentive to use more power or discover blocks faster than competitors. This means that many in-house blockchain solutions will be nothing more than cumbersome databases."[10]

Blockchain analysis

The analysis of public blockchains has become increasingly important with the popularity of bitcoin, Ethereum, litecoin and other cryptocurrencies.[42] A blockchain, if it is public, provides anyone who wants access to observe and analyse the chain data, given one has the know-how. The process of understanding and accessing the flow of crypto has been an issue for many cryptocurrencies, crypto-exchanges and banks.[43][44] The reason for this is accusations of blockchain enabled cryptocurrencies enabling illicit dark market trade of drugs, weapons, money laundering etc.[45] A common belief has been that cryptocurrency is private and untraceable, thus leading many actors to use it for illegal purposes. This is changing and now specialised tech-companies provide blockchain tracking services, making crypto exchanges, law-enforcement and banks more aware of what is happening with crypto funds and fiat crypto exchanges. The development, some argue, has led criminals to prioritise use of new cryptos such as Monero.[46][47][48] The question is about public accessibility of blockchain data and the personal privacy of the very same data. It is a key debate in cryptocurrency and ultimately in blockchain.[49]

Uses

Blockchain technology can be integrated into multiple areas. The primary use of blockchains today is as a distributed ledger for cryptocurrencies, most notably bitcoin. There are a few operational products maturing from proof of concept by late 2016.[37] Businesses have been thus far reluctant to place blockchain at the core of the business structure.[50]

Cryptocurrencies

Most cryptocurrencies use blockchain technology to record transactions. For example, the bitcoin network and Ethereum network are both based on blockchain. On 8 May 2018 Facebook confirmed that it is opening a new blockchain group[51] which will be headed by David Marcus who previously was in charge of Messenger. According to The Verge Facebook is planning to launch its own cryptocurrency for facilitating payments on the platform.[52]

Smart contracts

Blockchain-based smart contracts are proposed contracts that can be partially or fully executed or enforced without human interaction.[53] One of the main objectives of a smart contract is automated escrow. An IMF staff discussion reported that smart contracts based on blockchain technology might reduce moral hazards and optimize the use of contracts in general. But "no viable smart contract systems have yet emerged." Due to the lack of widespread use their legal status is unclear.[54][55]

Financial services

Major portions of the financial industry are implementing distributed ledgers for use in banking,[56][57][58] and according to a September 2016 IBM study, this is occurring faster than expected.[59]

Banks are interested in this technology because it has potential to speed up back office settlement systems.[60]

Banks such as UBS are opening new research labs dedicated to blockchain technology in order to explore how blockchain can be used in financial services to increase efficiency and reduce costs.[61][62]

Berenberg, a German bank, believes that blockchain is an "overhyped technology" that has had a large number of "proofs of concept", but still has major challenges, and very few success stories.[63]

The blockchain has also given rise to Initial Coin Offerings (ICOs) as well as a new category of digital asset called Security Token Offerings (STOs), also sometimes referred to as Digital Security Offerings (DSOs).[64] STO/DSOs may be conducted privately or on a public, regulated stock exchange and are used to tokenize traditional assets such as company shares as well as more innovative ones like intellectual property, real estate, art, or individual products. A number of companies are active in this space providing services for compliant tokenization, private STOs, and public STOs.

Video games

A blockchain game *CryptoKitties*, launched in November 2017.[65] The game made headlines in December 2017 when a cryptokitty character - an in-game virtual pet - was sold for more than US$100,000.[66] *CryptoKitties* illustrated scalability problems for games on Ethereum when it created significant congestion on the Ethereum network with about 30% of all Ethereum transactions being for the game.[67]

Cryptokitties also demonstrated how blockchains can be used to catalog game assets (digital assets).[68]

Specific token standards have been created to support the use of blockchain in gaming. These include the ERC-721 standard of *CryptoKitties* for non-fungible tokens, and the more recent ERC-1155 standard, for the creation of both fungible (e.g. an in-game currency) and non-fungible tokens (e.g. a set of rare armour) on the blockchain.

Use of blockchain in the creation of game assets can provide advantages to gamers. These include true ownership (assets are tied an individual's blockchain address rather than accessed from a centralized game server), transparency (blockchain explorers can be used to confirm total supply of various game assets), and interoperability (by being read from a decentralized public ledger, blockchain assets are open for any developers to integrate into their own game via blockchain if they choose to).[69]

Supply chain

There are a number of efforts and industry organizations working to employ blockchains in supply chain logistics and supply chain management.

The Blockchain in Transport Alliance (BiTA) works to develop open standards for supply chains.

Everledger is one of the inaugural clients of IBM's blockchain-based tracking service.[70]

Walmart and IBM are running a trial to use a blockchain-backed system for supply chain monitoring — all nodes of the blockchain are administered by Walmart and are located on the IBM cloud.[71]

Hyperledger Grid develops open components for blockchain supply chain solutions.[72][73]

Other uses

Blockchain technology can be used to create a permanent, public, transparent ledger system for compiling data on sales, tracking digital use and payments to content creators, such as wireless users[74] or musicians.[75] In 2017, IBM partnered with ASCAP and PRS for Music to adopt blockchain technology in music distribution.[76] Imogen Heap's Mycelia service has also been proposed as blockchain-based alternative "that gives artists more control over how their songs and associated data circulate among fans and other musicians."[77][78]

New distribution methods are available for the insurance industry such as peer-to-peer insurance, parametric insurance and microinsurance following the adoption of blockchain.[79][80] The sharing economy and IoT are also set to benefit from blockchains because they involve many collaborating peers.[81] Online voting is another application of the blockchain.[82][83] The use of blockchain in libraries is being studied with a grant from the U.S. Institute of Museum and Library Services.[84]

Other designs include:

- Hyperledger is a cross-industry collaborative effort from the Linux Foundation to support blockchain-based distributed ledgers, with projects under this initiative including Hyperledger Burrow (by Monax) and Hyperledger Fabric (spearheaded by IBM)[85]
- Quorum – a permissionable private blockchain by JPMorgan Chase with private storage, used for contract applications[86]
- Tezos, decentralized voting.[35]:94
- Proof of Existence is an online service that verifies the existence of computer files as of a specific time[87]

Types

Currently, there are at least four types of blockchain networks — public blockchains, private blockchains, consortium blockchains and hybrid blockchains.

Public blockchains

A public blockchain has absolutely no access restrictions. Anyone with an Internet connection can send transactions to it as well as become a validator (i.e., participate in the execution of a consensus protocol).[88] Usually, such networks offer economic incentives for those who secure them and utilize some type of a Proof of Stake or Proof of Work algorithm.

Some of the largest, most known public blockchains are the bitcoin blockchain and the Ethereum blockchain.

Private blockchains

A private blockchain is permissioned.[38] One cannot join it unless invited by the network administrators. Participant and validator access is restricted.

Hybrid blockchains

A hybrid blockchain has a combination of centralized and decentralized features.[89] The exact workings of the chain can vary based on which portions of centralization decentralization are used.

Academic research

In October 2014, the MIT Bitcoin Club, with funding from MIT alumni, provided undergraduate students at the Massachusetts Institute of Technology access to $100 of bitcoin. The adoption rates, as studied by Catalini and Tucker (2016), revealed that when people who typically adopt technologies early are given delayed access, they tend to reject the technology.[90]

Blockchain panel discussion at the first IEEE Computer Society TechIgnite conference

Blockchain and Internal Audit

The need for internal audit to provide effective oversight of organizational efficiency will require a change in the way that information is accessed in new formats.[91] Blockchain adoption requires a framework to identify the risk of exposure associated with transactions using blockchain. The Institute of Internal Auditors has identified the need for internal auditors to address this transformational technology. New methods are required to develop audit plans that identify threats and risks. The Internal Audit Foundation study, *Blockchain and Internal Audit,* assesses these factors. [92] The AICPA has outlined new roles for auditors as a result of blockchain.[93]

Energy use of proof-of-work blockchains

The Bank for International Settlements has criticized the public proof-of-work blockchains for high energy consumption.[96][94][97]

Nicholas Weaver, of the International Computer Science Institute at the University of California, Berkeley examines blockchain's online security, and the energy efficiency of proof-of-work public blockchains, and in both cases finds it grossly inadequate.[95][98]

External video

Cryptocurrencies: looking beyond the hype (https://www.youtube.com/watch?v=vo6s1mUjxQQ), Hyun Song Shin, Bank for International Settlements, 2:48[94]

Journals

In September 2015, the first peer-reviewed academic journal dedicated to cryptocurrency and blockchain technology research, *Ledger*, was announced. The inaugural issue was published in December 2016.[99] The journal covers aspects of mathematics, computer science, engineering, law, economics and philosophy that relate to cryptocurrencies such as bitcoin.[100][101]

Blockchains and Cryptocurrencies: Burn It With Fire (https://www.youtube.com/watch?v=xCHab0dNnj4), Nicholas Weaver, Berkeley School of Information, 49:47, lecture begins at 3:05[95]

The journal encourages authors to digitally sign a file hash of submitted papers, which are then timestamped into the bitcoin blockchain. Authors are also asked to include a personal bitcoin address in the first page of their papers for non-repudiation purposes.[102]

See also

- Changelog – a record of all notable changes made to a project
- Checklist – an informational aid used to reduce failure
- Economics of digitization
- Privacy and blockchain

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Well drilling

Well drilling is the process of drilling a hole in the ground for the extraction of a natural resource such as ground water, brine, natural gas, or petroleum, for the injection of a fluid from surface to a subsurface reservoir or for subsurface formations evaluation or monitoring. Drilling for the exploration of the nature of the material underground (for instance in search of metallic ore) is best described as *borehole* drilling.

The earliest wells were water wells, shallow pits dug by hand in regions where the water table approached the surface, usually with masonry or wooden walls lining the interior to prevent collapse. Modern drilling techniques utilize long drill shafts, producing holes much narrower and deeper than could be produced by digging.

Well drilling can be done either manually or mechanically and the nature of required equipment varies from extremely simple and cheap to very sophisticated.

Managed Pressure Drilling (MPD) is defined by the International Association of Drilling Contractors (IADC) as “an adaptive drilling process used to more precisely control the annular pressure profile throughout the wellbore." The objectives of MPD are “to ascertain the downhole pressure environment limits and to manage the annular hydraulic pressure profile accordingly."

Tricone rock bit

PDC (Polycrystalline Diamond Cutter) Drill Bit

Contents

History

The earliest record of well drilling dates from 347 AD in China.[1] Petroleum was used in ancient China for "lighting, as a lubricant for cart axles and the bearings of water-powered drop hammers, as a source of carbon for inksticks, and as a medical remedy for sores on humans and mange in animals."[2] In ancient China, deep well drilling machines were in the forefront of brine well production by the 1st century BC. The ancient Chinese developed advanced sinking wells and were the first civilization to use a well-drilling machine and to use bamboo well casings to keep the holes open.[3][4]

In the modern era, the first roller cone patent was for the rotary rock bit and was issued to American businessman and inventor Howard Hughes Sr. in 1909. It consisted of two interlocking cones. American businessman Walter Benona Sharp worked very closely with Hughes in developing the rock bit. The success of this bit led to the founding of the Sharp-Hughes Tool Company. In 1933 two Hughes engineers, one of whom was Ralph Neuhaus, invented the tricone bit, which has three cones. The Hughes patent for the tricone bit lasted until 1951, after which other companies made similar bits. However, Hughes still held 40% of the world's drill bit market in 2000. The superior wear performance of PDC bits gradually eroded the dominance of roller cone bits and early in this century PDC drill bit revenues overtook those of roller cone bits. The technology of both bit types has advanced significantly to provide improved durability and rate of penetration of the rock. This has been driven by the economics of the industry, and by the change from the empirical approach of Hughes in the 1930s, to modern day domain Finite Element codes for both the hydraulic and cutter placement software.

Drill bits in mechanical drilling

The factors effecting drill bit selection include the type of geology and the capabilities of the rig. Due to the high number of wells that have been drilled, information from an adjacent well is most often used to make the appropriate selection. Two different types of drill bits exist: fixed cutter and roller cone. A fixed cutter bit is one where there are no moving parts, but drilling occurs due to shearing, scraping or abrasion of the rock. Fixed cutter bits can be either polycrystalline diamond compact (PDC) or grit hotpressed inserts (GHI) or natural diamond. Roller cone bits can be either tungsten carbide inserts (TCI) for harder formations or milled tooth (MT) for softer rock. The manufacturing process and composites used in each type of drill bit make them ideal for specific drilling situations. Additional enhancements can be made to any bit to increase the effectiveness for almost any drilling situation.

A major factor in drill bit selection is the type of formation to be drilled. The effectiveness of a drill bit varies by formation type. There are three types of formations: soft, medium and hard. A soft formation includes unconsolidated sands, clays, soft limestones, red beds and shale. Medium formations include dolomites, limestones, and hard shale. Hard formations include hard shale, calcites, mudstones, cherty lime stones and hard and abrasive formations.

Until 2006, market share was divided primarily among Hughes Christensen, Security-DBS (http://www.halliburton.com/ps/default.aspx?navid=1368&pageid=57&prodgrpid=MSE%3a%3a1045760741741661/) (now Halliburton Drill Bits and Services), Smith Bits (http://www.slb.com/services/drilling/drill_bits.aspx) (a subsidiary of Schlumberger), and REEDHycalog (http://www.reedhycalog.com/) (acquired by NOV in 2008).

By 2014, Ulterra (then a subsidiary of ESCO Corp.) and Varel International (now a subsidiary of Swedish engineering group Sandvik) had together gained nearly 30% of the U.S. bit market and eroded the historical dominance of the Smith, Halliburton, and Baker Hughes. By 2018, Slumberger, which acquired Smith in 2010 [5], became dominant in international markets thanks to packaging drill bits with their other tools and services, while Ulterra (now owned by private equity firms Blackstone Energy Partners and American Securities) continued a Stark growth trend, becoming the market share leader in drill bits in the US according to Spears Research [6] and Kimberlite Research [7].

Tricone bit for well drilling (medium worn-out)

PDC bit for well drilling

Multiple Tricone Bits

Tricone Bit

Drill Bit

Damaged Drill Bit, pieces missing on the left hand cone

Mud log in process, a common way to study the lithology when drilling oil wells

Evaluation of the dull bit grading is done by a uniform system promoted by the International Association of Drilling Contractors (IADC). See Society of Petroleum Engineers / IADC Papers SPE 23938 & 23940. See also PDC Bits (http://www.glossary.oilfield.slb.com/Display.cfm?Term=PDC%20bit)

See also

- Blowout (well drilling)
- Borehole
- Deep well drilling
- Driller (oil)
- Drilling mud
- Drilling rig
- Underbalanced drilling
- Water well

Manual well drilling methods

- Baptist well drilling
- Sludging

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- ***First Filing Deadline:*** You must file a Declaration of Use (or Excusable Nonuse) between the 5th and 6th years after the registration date. See 15 U.S.C. §§1058, 1141k. If the declaration is accepted, the registration will continue in force for the remainder of the ten-year period, calculated from the registration date, unless cancelled by an order of the Commissioner for Trademarks or a federal court.

- ***Second Filing Deadline:*** You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between the 9th and 10th years after the registration date.* See 15 U.S.C. §1059.

Requirements in Successive Ten-Year Periods*
What and When to File:

- You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between every 9th and 10th-year period, calculated from the registration date.*

Grace Period Filings*

The above documents will be accepted as timely if filed within six months after the deadlines listed above with the payment of an additional fee.

***ATTENTION MADRID PROTOCOL REGISTRANTS:** The holder of an international registration with an extension of protection to the United States under the Madrid Protocol must timely file the Declarations of Use (or Excusable Nonuse) referenced above directly with the United States Patent and Trademark Office (USPTO). The time periods for filing are based on the U.S. registration date (not the international registration date). The deadlines and grace periods for the Declarations of Use (or Excusable Nonuse) are identical to those for nationally issued registrations. See 15 U.S.C. §§1058, 1141k. However, owners of international registrations do not file renewal applications at the USPTO. Instead, the holder must file a renewal of the underlying international registration at the International Bureau of the World Intellectual Property Organization, under Article 7 of the Madrid Protocol, before the expiration of each ten-year term of protection, calculated from the date of the international registration. See 15 U.S.C. §1141j. For more information and renewal forms for the international registration, see http://www.wipo.int/madrid/en/.

NOTE: Fees and requirements for maintaining registrations are subject to change. Please check the USPTO website for further information. With the exception of renewal applications for registered extensions of protection, you can file the registration maintenance documents referenced above online at http://www.uspto.gov.

NOTE: A courtesy e-mail reminder of USPTO maintenance filing deadlines will be sent to trademark owners/holders who authorize e-mail communication and maintain a current e-mail address with the USPTO. To ensure that e-mail is authorized and your address is current, please use the Trademark Electronic Application System (TEAS) Correspondence Address and Change of Owner Address Forms available at http://www.uspto.gov.