Library Hi Tech

What's Trending in Blockchain Technology and its Potential Uses in Libraries

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What's Trending in Blockchain Technology and its Potential Uses in Libraries

Blockchain is a relatively new technology used to verify and store transaction records for online cryptocurrencies like Bitcoin. Beyond online currencies, the blockchain has potential uses in health care, education, and many other fields. Blockchain is described by many people, but in essence is a type of distributed ledger for maintaining a permanent and tamper-proof record of transactional data. A blockchain functions as a decentralized database that is managed by computers belonging to a peer-to-peer (P2P) network (http://www.bohyunkim.net/blog/archives/3967#.XV6ysehKjIU). Each of the computers in the distributed network maintains a copy of the ledger to prevent a single point of failure (SPOF) and all copies are updated and validated simultaneously.

Blockchains were commonly associated with digital currencies such as Bitcoin, or alternate versions of Bitcoin like Bitcoin Cash. Today, blockchain applications are being explored in many industries as a secure and cost-effective way to create and manage a distributed database and maintain records for digital transactions of all types. The San Jose University (SJSU) iSchool initiated the first major examination of blockchain and its potential impact on information services as reported by Jessie Leigh Brown in a 2018 article.

How blockchain works

Explained in ordinary terms, " a blockchain ledger consists of two types of records, individual transactions and blocks. The first block consists of a header and data that pertains to transactions taking place within a set time period. The block's timestamp is used to help create an alphanumeric string called a hash. After the first block has been created, each subsequent block in the ledger uses the previous block's hash to calculate its own hash. Before a new block can be added to the chain, its authenticity must be verified by a computational process called validation or consensus. At this point in the blockchain process, a majority of nodes in the network must agree the new block's hash has been calculated correctly".

Lots of different parties can read and write transactions to the database. Instead of a third party checking those transactions, the blockchain has a built in consensus search mechanism that checks transactions to make sure they are good. transactions of all types.

In the workings of a Blockchain, before a new block can be added to the chain, its authenticity must be verified by a computational process called validation or consensus. The network of chains making up the blockchain thus are validations of validations of yet other validations, making up the whole. In libraries, the technology for using blockchain can be utilized for different processes. This functions as a verification system that is in itself verifying another system.

Uses of Blockchain

Blockchain can be used to buildd an enhanced metadata center, used for protecting Digital First Scale rights, for supporting community based collections, and for facilitating partnerships across organizations. Read more on how blockchain can be used in libraries at https://americanlibrariesmagazine.org/2019/03/01/library-blockchain-reaction/. It's trending!

Carrie Smith in a March 1, 2019 article reported that an International Museum and Library Society National Forum held in 2018 on blockchain's potential in libraries identified the fact that libraries can use blockchain for interlibrary loan, scholarly publishing, credentialing and the development of a universal library card. Blockchain could also be useful in answering reference questions according to the American Libraries magazine (https://americanlibraries.magazine.org/2019/03/01/library.blockchain-reaction/).

Generally, some suggestions in the past have been that Blockchain could be deployed in modernizing procedures to borrow books from libraries. Cabello, Jensen and Muhle (2017) proposed that library patrons can lend books directly to other patrons without first returning it to the library. Such transactions could be made as long as the patrons are registered with a participatory

library. Law libraries also could use blockchain to authenticate primary sources, and could change views on intellectual property because of the links and verifications of databases. Since Blockchain links to databases, it could be used for provenance tracking or media rights management.

Blockchain is being used as a business solution. Applications are being built directly into blockchains to create smart contracts that store debt registers or execute specific instructions in accordance with given events at specified times. Apart from business applications, blockchain could revolutionize the ways that institutions store personal information. "Sony is exploring blockchain to store student information - registration documents, attendance, grades, and even the lesson plans that previous teachers have used – that could then easily be transferred between schools as students move or graduate into new institutions." (See https://www.engadget.com/2017/08/09/sony-blockchain-education-records/). Southern New Hampshire University is also reported to be planning to pilot a program to provide one thousand alumni with blockchain-based digital credentials – the digital credentials will not replace paper degrees or traditional transcripts but will serve as an enhanced version of a student's academic record and as a platform to organize the certifications, competencies, and achievements that come with lifelong learning. Read more at https://www.snhu.edu/about-us/newsroom/2018/06/blockchain-securing-school-records.

Proof of Existence allows users to certify documents in the Bitcoin blockchain, anonymously and securely creating an online distributed proof of existence for any data or document. Future visions for blockchain technology could help secure personal identities – birth and death certificates, marriage licenses, property deeds and titles of ownership, and other life records – in a blockchain that citizens could control and share with institutions (hospitals, employers, banks) as they need. Even as governments show interest in blockchain, most are only engaged in informal discussions at this time. The National Association of State Chief Information Officers (NASCIO) notes that the computing power and network storage requirement are a central impediment to making theoretical applications real.

Libraries could use Blockchain to "prototype a metadata or Cataloguing system that stored it's information in a Blockchain and used cryptographic signing to

allow for selective retrieval". This was opined by Jason Griffey, founder and principal at Evenly Distributed. Read more at http://www.ala.org/tools/future/trends/blockchain.

Rubel (2019) in an article explained how permissionless metadata blockchains could be created to overcome limitations in current cataloging practices. Limitations such as centralization and a lack of traceability of cataloguing records. The process would start by creating public and private keys, which could be managed in such a way as to give Cataloguers a choice of whether to use a full version of the record, or an abridged version.

"Nowadays, blockchain technology is not limited to just cryptocurrencies but is being implemented in various social and corporate segments. These include e-governance, social networking, e-commerce, transportation, logistics, professional communications and many others.

The blockchain refers to the high-performance and security-aware technology in which a digital ledger is maintained. The digital ledger is quite transparent and there is no scope for any manipulation in the records by intermediaries or any administrator. The records of all the transactions are logged in the blockchain ledger, and the operations are committed finally with different protocols and algorithms that cannot be hacked by third party intrusions." Read about how blockchain is used in the Python programme at https://www.google.com/amp/s/opensourceforu.com/2019/08/using-python-tools-and-libraries-for-blockchain-programming/amp/. The challenges of using Blockchain in libraries would in essence be that of overcoming technical hurdles, training library stafff in how to use it, and how to modify it's use, as new uses for it in the library crop up.

References

Rubel, D. (2019). No Need to Ask. Information Technology and Libraries, 38(2), 11-17. https://doi.org/10.6017/ital.v38i2.10822.

https://americanlibrariesmagazine.org/2019/03/01/library-blockchain-reaction/