

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320-088X
IMPACT FACTOR: 6.017



IJCSMC, Vol. 7, Issue. 10, October 2018, pg.33 – 36

A Proposal of Decentralised and Distributed Blockchain Secured Educational Network for Higher Education

G.Sri Pradha¹, J.Vanathi², S.Jaya Prasanna³

¹ Research Scholar, State Resource Centre, Adyar, University of Madras, Chennai – 600005

²Head of the Department, B.Sc IT, Gurunanak College, Velachery Road, Chennai- 600042

³Asst. Professor, Department of Computer Science, T. S. Narayanaswami college of Arts and science, Navalur, Chennai 603103

¹shripradha.sathish@gmail.com, ²vanathij69@gmail.com, ³aashisrikrish@gmail.com

Abstract: *The top use case of Blockchain is Identity Management. IndiaChain is the Government of India's plan to implement a complete blockchain infrastructure that will match IndiaStack. In future, IndiaChain will be linked with IndiaStack & other government Digital Identification Databases. IndiaStack is a set of code developed around India's unique Identity project Aadhar. If implemented, IndiaChain will be the largest blockchain implementation across the globe. With such massive plans of moving towards Digital India, in this paper we present a blockchain implementation on education system, in which we can obtain the authentic transcripts for any candidate in any part of India.*

Keywords: *Blockchain, security, identity, education, DID*

I. Introduction:

In layman's terminology, Block chain is the decentralized distribution of digital ledgers. These digital ledgers are maintained by networks of computers called Nodes. The greatest advantage of blockchain is the security of data. The digital data in the network cannot be changed by any individual until and unless all the other nodes maintaining the data agree for the same. Since the records are decentralized, there is no concept of Single node here. This makes data in blockchain virtually impossible to hack & highly protected. The electronic information associated with an individual in a particular identity system is called a digital identity. These identity systems can be used for authentication and authorization.

There are three methods of authenticating a person:

- Something you know (password, pin code)
- Something you have (smartcard, hardware token generator)
- Something you are (biometric; like fingerprints)

Determining what an entity is allowed to do and enforcing this policy once they are authenticated is called authorization.

II. Block Chain for Identity Management:

Most of the online transactions these days require the individuals to disclose some specific personal information for identification. Any financial transactions also require you to provide either your sign in credentials or finger prints or other personal details as well. Because of all these, the digital clones of a particular individual are available across various platforms. Ultimately, this leads to security threat which leads to high vulnerability of the current system.

In this paper, we are proposing a platform in which blockchain can be successfully implemented in the field of Education. The reason to use blockchain is that the individuals can easily create a self -sovereign identity. The platform is flexible and secure for resource sharing in a nation or even global level [1]. Often, we come across cases of malpractices involved in transcripts. The absence of a common platform to authorize and authenticate the transcript is one primary reason for this to happen in various parts of the country today. Blockchain technology can be fruitfully engaged in this scenario to maintain the ledgers of student's data from Universities all over India. The advantages of this technology is shown above in Fig. 1. We are proposing a Hyper ledger Indy – Distributed Ledger Platform for decentralized identity Management.

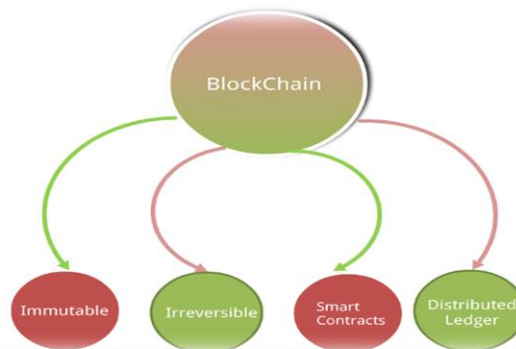


Fig 1. Block chain – Internet Of Value

III. Proposed System:

In this system, all the universities across India are tied up together under a blockchain based common network. This platform is responsible for processing, handling & monitoring the transcript data of various universities. The system also ensures transparency and would help in achieving maximum benefits [2]. Each student will also be allotted a dedicated blockchain wallet. All the course credits earned by the candidate are issued by the university into the wallets. After every semester result are published, the student's data are transferred to the blockchain network. Thus, the entire record of the college is distributed over a wide network [3]. It carries not just the student data, but the sender's information along with the course details. Once the details are updated, the student also receives a notification of the same which can be crosschecked by the candidate. Thus, just by providing the blockchain address, a student can show the recruiter the transcript which rules out the need for a hard copy. Let us assume that a candidate needs the degree certificate to apply for a particular job. To get the authentic degree certificate from the respective University, the candidate has to share his/her identity for college verification. A Distributed Identifier (DID) is generated and shared with the candidate's college. The respective college verifies the DID & the blockchain address, which in turn authenticates that the candidate is a bonafide student of that particular college and establishes a connection. Hyperledger Indy calls this as a Pairwise relationship each having a separated DID. Pairwise relationships are added to the ledgers after verification of the DID. This is after the consensus with the other nodes of the blockchain network which are the trust groups. If a particular record is being tampered in the network, that block will not be linked with other nodes in the network. The trust group use α public key to verify the DID. The other nodes neither knows the candidate not his/her college. The entire privacy is preserved through DID. These decentralized digital identities and Identity hubs can allow the students to access to their own data at a click of the button with reduced risk. The pictorial representation of the proposed system is shown below in Fig 2. DID is not the self-sovereign identity of the candidate. Sovereignty is the principle that entities

should be able to have control of their own digital identity [4]. It is used as the id card for college access. The trust group will check whether the id card is not counterfeit.

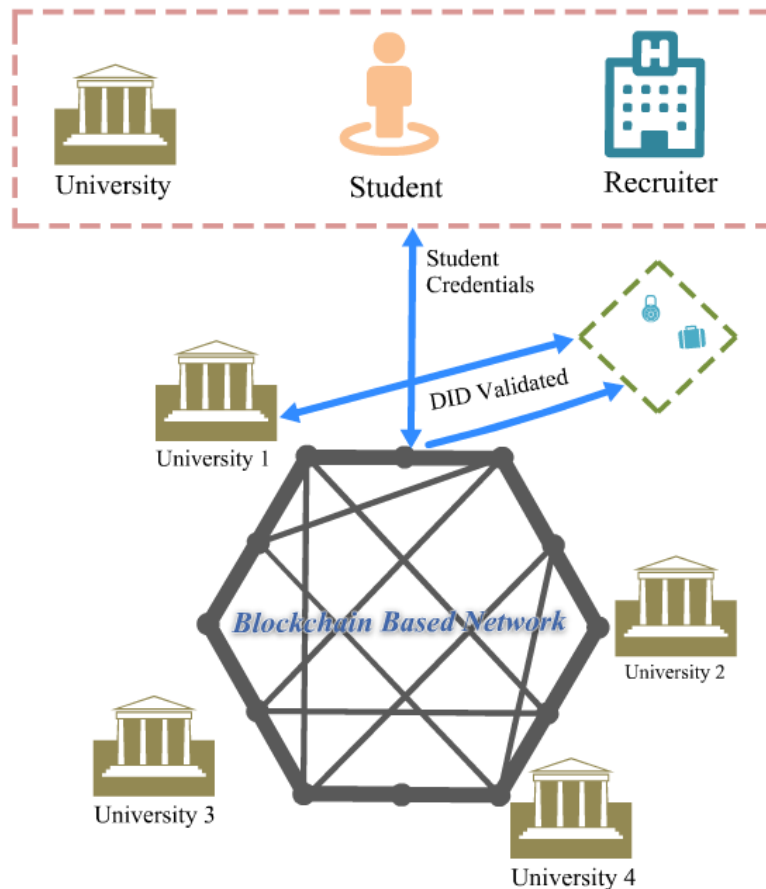


Fig 2. Proposed Block chain Based Education System

Once the consensus is reached, the connection can be accepted and information can be shared. The candidate thus will create a connection with the office with a new DID. Now the transcript is embedded with the DID. This can be submitted by the University either to the candidate or the concerned organization in which the candidate is selected. This way, the transcripts are all authorized & authenticated by the respective university which will avoid submission of fake certificates. Students can also have their course history in a single transparent window [5]. This allows a transparency in the entire higher education system. The same can also be implemented in schools during their checkpoint exams. The proposed system not only reduced the manual paper work and record maintenance that's being practiced in the traditional education system but also makes all the data available at an end to end secured platform which paves a way for a truly digital India in the field of higher education as well.

Conclusion:

As discussed in this paper, this digitally driven education system will definitely reduce the number malpractices that's reported due to fake transcripts. Since, no hardcopy of transcript is issued by the University, the traditional and the physical record maintenance is much reduced in this approach. There is a transparency maintained across the network as well which increases the trust factor. We hereby suggest using suitable version of blockchain technology and implementing the same to pave way for an integrated grading system in colleges across India. The same system could be implemented in future for various other certification courses as well there by moving towards a truly Digital India.

References:

- [1] G. Coulouris, J. Dollimore, T. Kindberg, and G. Blair, *Distributed Systems: Concepts and Design*, 5th ed. Reading, MA, USA: Addison-Wesley, 2011.
- [2] V. Morabito, "Blockchain Governance," in *Business Innovation Through Blockchain*. Cham, Switzerland: Springer, 2017, pp. 41–59.
- [3] Sharples M., Domingue J. (2016) *The Blockchain and Kudos: A Distributed System for Educational Record, Reputation and Reward*. In: Verbert K., Sharples M., Klobučar T. (eds) *Adaptive and Adaptable Learning*. EC-TEL 2016. Lecture Notes in Computer Science, vol 9891. Springer, Cham
- [4] J. Sun, J. Yan, and K. Z. K. Zhang, "Blockchain-based sharing services: What blockchain technology can contribute to smart cities," *Financial Innov.*, vol. 2, no. 1, p. 26, Dec. 2016.
- [5] M. Turkanović, M. Hölbl, K. Košič, M. Heričko, A. Kamišalić, "Eductx: A blockchain-based higher education credit platform", *IEEE Access*, 2018.