

**PROVIDING SECURITY FOR THE CERTIFICATES  
USING BLOCKCHAIN AND IPFS**

A project report submitted in partial fulfillment of the requirements  
for the award of the Degree of

**BACHELOR OF TECHNOLOGY  
IN  
COMPUTER SCIENCE & ENGINEERING**

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**CERTIFICATE**

This is to certify that the Project Report entitled "PROVIDING SECURITY FOR THE CERTIFICATES USING BLOCKCHAIN AND IPFS" being submitted by B.Gowthami Regd.No.17811A0514 N.CHANUKYA DEVI- 17811A0537, S.SAI SHIVANI - 17811A0546 AND P.HARISH- 16811A0570 in partial fulfilment of the requirements for the degree of B.Tech (CSE) in Department of Computer Science & Engineering to the Jawaharlal Nehru Technological University Kakinada is a record of bonafide work carried out by her under my guidance and supervision.

The results embodied in this thesis have not been submitted to any university or institute for the award or any degree of diploma.

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## ABSTRACT

In 2008, the emergence of the blockchain as the foundation of the first ever decentralized cryptocurrency not only revolutionized the financial industry but proved a boon for peer-to-peer information exchange in the most secure, efficient, and transparent manner. The blockchain is a public ledger which works like a log by keeping a record of all transactions in a chronological order, secured by an appropriate consensus mechanism and providing an immutable record. Its exceptional characteristics include immutability, irreversibility, decentralization, persistence and anonymity. With these advantages, it has found applications in almost all fields requiring data sharing among multiple parties but with secure authentication, anonymity and permanence. Some of the applications are finance, real-estate, and IoT. Despite having numerous benefits, the blockchain suffers from various disadvantages, particularly reaching consensus in a vast network quickly, energy consumption in computation, and requiring storage of the entire chain for verification.

The Inter Planetary File System (IPFS) is a peer-to-peer distributed file system that seeks to connect all computing devices with the same system of files. In some ways, IPFS is similar to the Web, but IPFS could be seen as a single BitTorrent swarm, exchanging objects within one Git repository. In other words, IPFS provides a high throughput content-addressed block storage model, with content-addressed hyperlinks. This forms a generalized Merkle DAG, a data structure upon which one can build versioned file systems, blockchains, and even a Permanent Web. IPFS combines a distributed hash table, an incentivized block exchange, and a self-certifying namespace. IPFS has no single point of failure, and nodes do not need to trust each other.

Large files cannot be efficiently stored on blockchains. On one hand side, the blockchain becomes bloated with data that has to be propagated within the blockchain network. On the other hand, since the blockchain is replicated on many nodes, a lot of storage space is required without serving an immediate purpose, especially if the node operator does not need to view every

file that is stored on the blockchain. It furthermore leads to an increase in the price of operating blockchain nodes because more data needs to be processed, transferred and stored. Inter Planetary File System (IPFS) is a file sharing system that can be leveraged to more efficiently store and share large files. It relies on cryptographic hashes that can easily be stored on a blockchain. It does not allow users to share files with concern authorities. This is necessary, if sensitive or personal data needs to be shared. The main objective of the project is file uploading and sharing in IPFS platform and providing security and protection by block chain technology. The permission to access the file can be given by developing a smart contract in Ethereum, there by the files can be accessed. The concern authorities which are given access to view files in IPFS is discussed.