

# Department of Information Technology

A.P. Shah Institute of Technology

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UNIVERSITY OF MUMBAI

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A Project Report on

# Enhancing Data Security in Cloud using Blockchain

Submitted in partial fulfillment of the degree of

Bachelor of Engineering(Sem-7)

in

**INFORMATION TECHNOLOGY**

By

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# 1. Project Conception and Initiation

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# 1.1 Abstract

The practice of using a network of remote servers hosted on the internet to store, manage and process data rather than a local server or a personal computer is called a cloud. A proposal is made to enhance the security of data stored on cloud service by using blockchain as the technology. The protocol is used to store data on cloud in the form of chunks or blocks which are linked to each other by hash pointers which allows the data to be stored in historical format and ensures better security

# 1.2 Objectives

- To provide effective security to the data stored on cloud.
- To maintain better integrity of data on cloud.
- To avoid fraudery of data.
- To have the consensus mechanism for the cloud group users.

# 1.3 Literature Review

Paper title:- Bitcoin: A peer-to-peer electronic cash system.

Author:-Nakamoto S

Publication details:- <https://bitcoin.org/bitcoin.pdf>

Findings:- Revised the implementation of blockchain as a technology with a wide scope and found its use in the first cryptocurrency ever created i.e. Bitcoin with blockchain as a technology and SHA-256 as its hash function. First general use of blockchain to secure transactions.

Advantages:- Provides a secure means of transaction with lowest possible chance of risks involved with tampering. Calculating hash would require a lot of effort.

Disadvantages:- Requires a good network speed and is not as cost effective when it comes to transactions. Its also complex to be implemented.

# Literature Review

Paper title:-Blockchain contract: A complete consensus using blockchain.

Author:- Watanabe, H., Fujimura, S., Nakadaira, A., Miyazaki, Y., Akutsu, A., & Kishigami

Publication details:- 2015 IEEE 4th Global Conference on Consumer Electronics.

Findings:- Use of blockchain consensus in online or data contracts and making it more secure. Consensus mechanism allows every party in the contract to share their consent regarding the contract which provides a secure and satisfactory result.

Advantages:- The parties involved in the contract might be anonymous because of blockchain. This helps keep the information from being overused in the cyberspace.

Disadvantages:- The consensus mechanism consumes a lot of resources, hence its hefty to be used. The anonymity because of blockchain is also a concern when dealing with the cyber fraudery.

# Literature Review

Paper title:- IHIDS: Introspection-Based Hybrid Intrusion Detection System in Cloud Environment”

Author:- Amita Kashyap, G. Sravan Kumar, Sunita Jangir, Emmanuel S. Pilli, Preeti Mishra

Publication details:- 2017 IEEE

Findings:- Use of Intrusion detection system in the hypervisor layer of the cloud which allows the cloud owner and admin to be notified when in the midst of intrusion by an unauthorized party.

Advantages:- Notifies all unnatural activities to the cloud admin and also notifies internal or external attacks since all data passes through the hypervisor layer.

Disadvantages:- IDS only notifies the infiltration, it doesn't lock it. Hence, at times it would be too late before the user or admin is notified.



# 1.4 Problem Definition

- In current scenario cloud security is good but after a certain extend can be compromised, in order to overcome such a scenario, we are providing an extra layer of security to the cloud data using blockchain.
- Providing blockchain to data will ensure better security on the cloud servers thus providing secure means of data transmission.

# 1.5 Scope

- Can be implemented on any kind of data that is stored on the cloud.
- Can be used to provide security to any confidential data.
- Can be implemented in sectors like IT, Medical, Banking , etc.

# 1.6 Technology stack

- Operating System : Windows 07 And Above
- Cloud platform : Cloud Service.
- SHA 256 / MD5 : Cryptographic algorithm for creating hash values of data.
- Navicat : For visualization of the blocks and generated hash values.
- Eclipse Luna : Integrated Development Environment (IDE) for java programming.
- My SQL : For Database storage.
- JDK : For programming as it is object oriented, easy to write, compile, debug, platform-independent.

# Technology stack

- Blockchain : For providing three main components to the data cryptography, distributed list structures and a decentralized system. Depending on these three which can be implemented through software, blockchain can be open source or proprietary. It's one of the latest technological trends now in the industry and provides a highly secure environment when used as compared to other cryptography and encryption standards.

# 1.7 Benefits for environment & Society

- No need for a central administrator .
- Users are in control of all their information and transactions .
- Blockchain offers access security, scalability, and data privacy.
- Much advance security as blockchain needs high computational power to generate nonce value for each block.

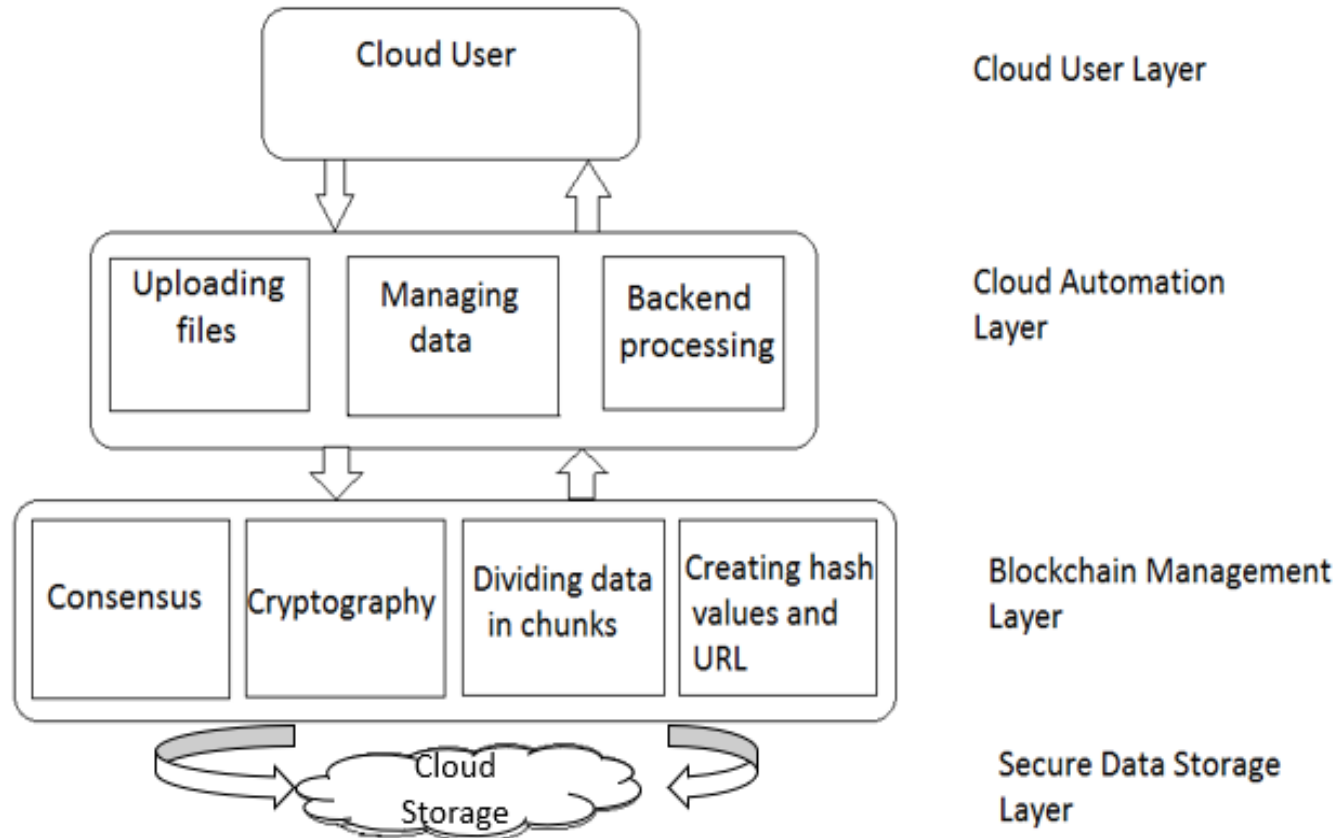
## 2. Project Design

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## 2.1 Proposed System

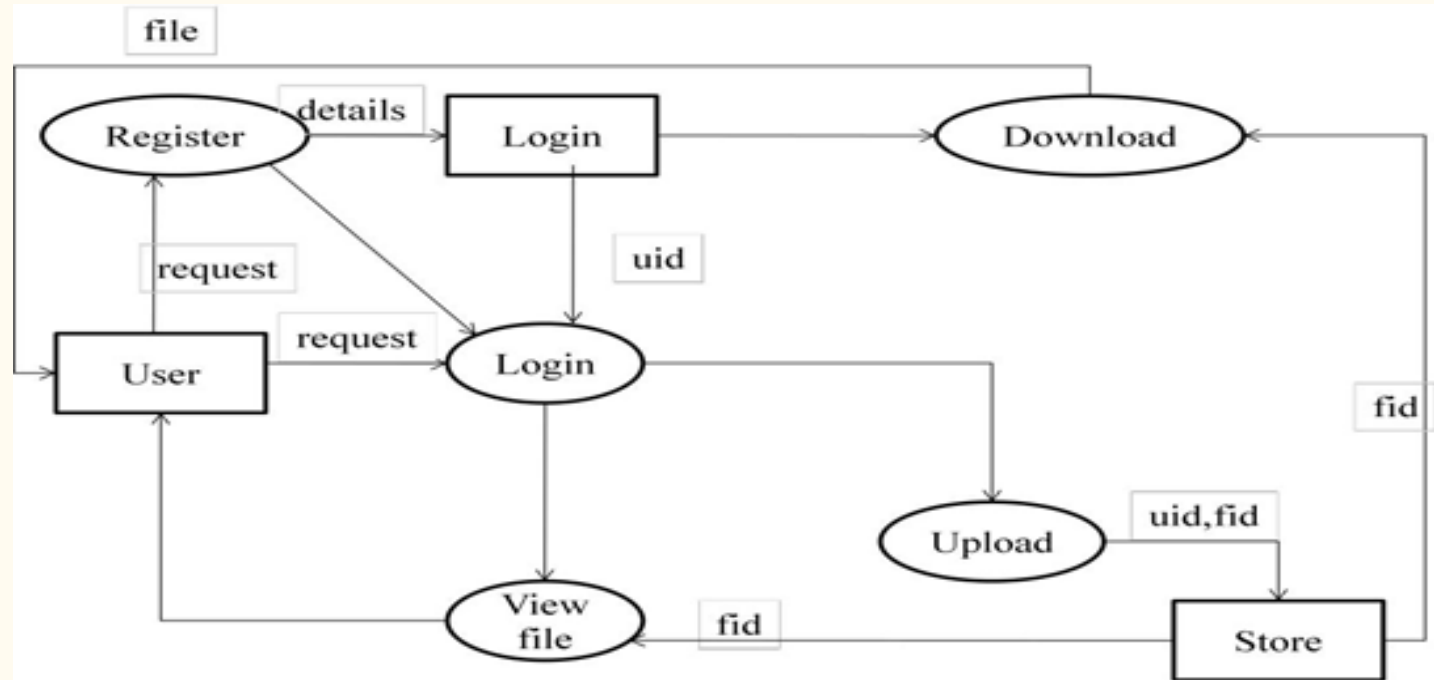
- Securing data through blockchain.
- Providing a proper hospital UI.
- Uploading reports and securing it through encryption and hash values.

## 2.1.1 Proposed System



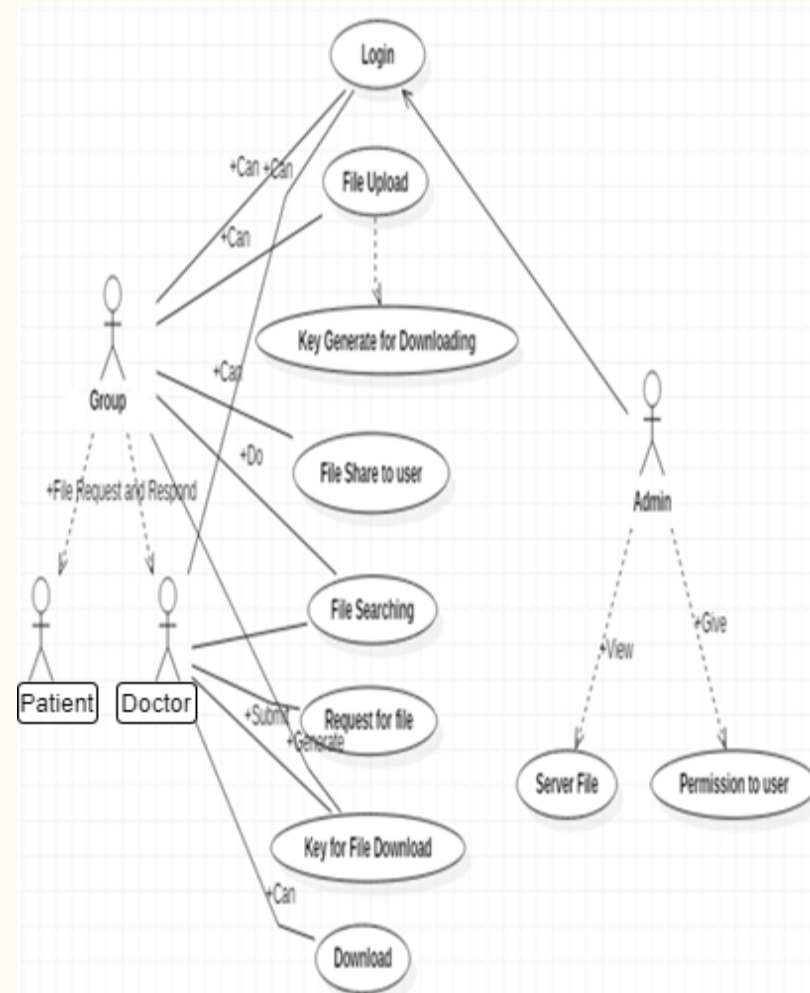


## 2.2 Design(Flow Of Modules)

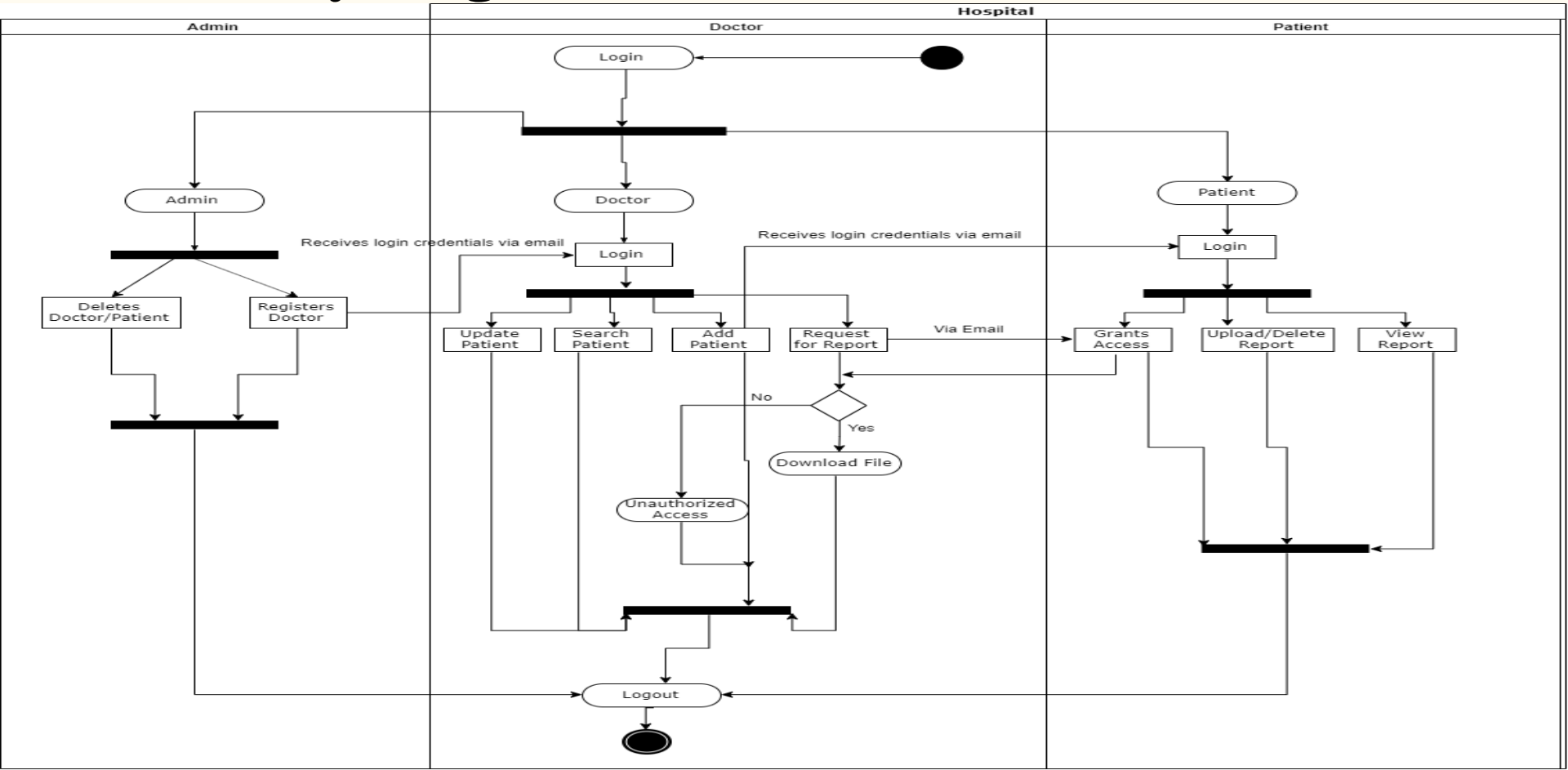


## 2.3 Description Of Use Case

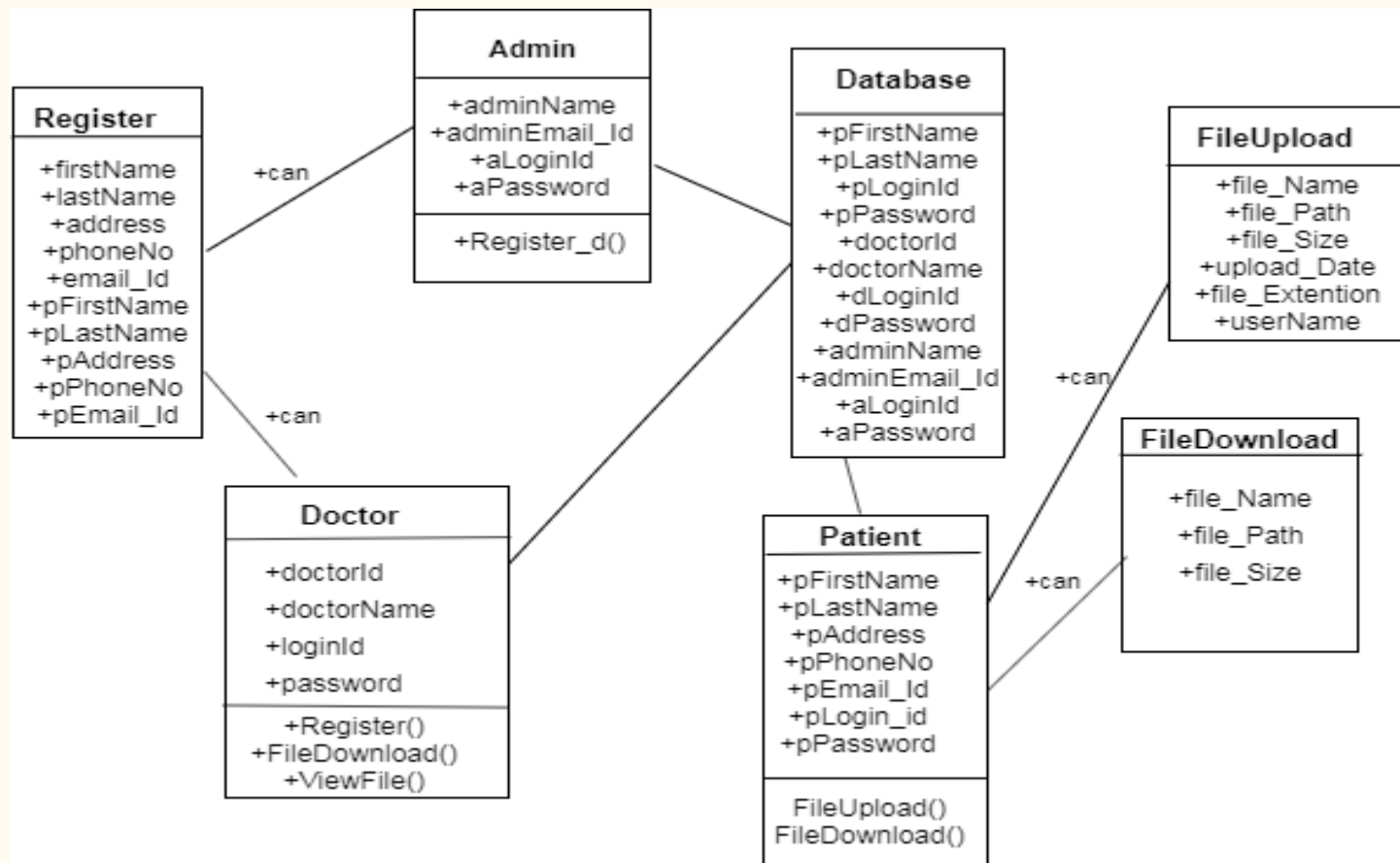
- The Admin will add doctors and will have permissions to delete doctors and patients.
- Doctor will add new patients and can prescribe medicines, Doctors will need a key to download report that would be present with the patient.
- Patients can upload reports and grant access to view there reports.



# 2.4 Activity diagram



## 2.5 Class Diagram



## 2.6 Module-1

### Web Interface:

- Admin side to manage the whole website for granting and revoking privileges to the other entities of website.
- Doctors Portal that would deal with dealing with patients like adding new patients, prescribing medicines, requesting to view report.
- Patients Portal that would be able to upload report, view there own report, grant access to authorized doctors for there report .

# Module-2

## Web Interface Backend

- Backend mainly concentrates on report uploading.
- Along with this it will consist of generating hash values and dividing it into chunks to stores it with the concept of blockchain.
- Some minor fields like storing user credentials for authentication, storing prescribed medicines.

# Module-3

## Blockchain & Hashing

- At first the data would be stored with the help of certain algorithm.
- After which the data would be divided into chunks and hash values would be generated
- These chunks with there hash values will be interconnected with the concept of blockchain.

## 2.7 References

- [1] Nakamoto S. Bitcoin: A peer-to-peer electronic cash system[J]. Consulted, 2008.
- [2] 2017 International Conference on Advances in Computing, Communications and Informatics (ICACCI) Amita Kashyap, G. Sravan Kumar, Sunita Jangir, Emmanuel S. Pilli, Preeti Mishra “IHIDS: Introspection-Based Hybrid Intrusion Detection System in Cloud Environment”.
- [3] Watanabe, H., Fujimura, S., Nakadaira, A., Miyazaki, Y., Akutsu, A., & Kishigami, J. J. (2015). Blockchain contract: A complete consensus using blockchain. 2015 IEEE 4th Global Conference on Consumer Electronics (GCCEP).
- [4] Zhe, D., Qinghong, W., Naizheng, S., & Yuhan, Z. (2017). Study on Data Security Policy Based on Cloud Storage. 2017 IEEE 3rd International Conference on Big Data Security on Cloud (BigDataSecurity), IEEE International Conference on High Performance and Smart Computing, (HPSC) and IEEE International Conference on Intelligent Data and Security (IDS).
- [5] Bharadwaj, D. R., Bhattacharya, A., & Chakkaravarthy, M. (2018). Cloud Threat Defense – A Threat Protection and Security Compliance Solution. 2018 IEEE International Conference on Cloud Computing in Emerging Markets (CCEM).



# 3.Planning for next semester

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# Planning

- Completion of backend.
- Working of blockchain mechanism.
- Integrating it with any of the cloud services.

**Thank You**

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