**SEMINAR ABSTRACT**

**BLOCKCHAIN TECHNOLOGY**

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**Introduction**

The introduction of cryptocurrencies, specifically Bitcoin, has brought the concept of blockchain technology into the mainstream. A blockchain is a continuously growing distributed database that protects against tampering and revision of data.

Bitcoin uses blockchain to maintain its public ledger of every single transaction ever made with Bitcoin. This Merkle tree approach allows for a greater hashing mechanism to provide efficient and secure verification of large amounts of data. This information is then used by Bitcoin to enforce their transactional checks.

Though Bitcoin did not manage to completely disrupt the world market, the technology behind it has the potential to do so. Currently, blockchain is being used to solve problems other than cryptocurrencies–Nasdaq OMX is testing the technology for stock trading, while e-retail giant Overstock has released itsdigital bonds using blockchain.

Blockchain is not just limited to the financial system; instead, it is a great solution for almost any platform or product that requires trust, such as keyless automobile entry authentication. Additionally, [IBM and Samsung recently revealed](http://www.coindesk.com/ibm-reveals-proof-concept-blockchain-powered-internet-things/) a proof of concept that use blockchain as the backbone of the Internet of Things.

**Purpose of the system**

A Blockchain consists of a set of protected information blocks chained sequentially to one another. Together, they form an immutable ledger, distributed over participating nodes. These nodes are computing platforms that interact with end users. The terms Blockchain and distributed ledger are commonly used as synonyms. The purpose of the ledger is to share information amongst all parties that access it via an application. Access may be unrestricted or restricted. The shared information is protected against modification. Any alteration would be easily and immediately detectable. So, once information is recorded on a Blockchain, it’s considered immutable because it’s so strongly protected.

**Objectives**

The key to overcoming the problems in central institutions is the block chain. Because, with the block chain, for the first time, we no longer need these central institutions for settlement, or for guaranteeing the value of coins, or for land titling. All of these functions can be replaced by a transparent public ledger that is safe from tampering, and which can make value and ownership clear and open for everyone… In turn, this spreads decision-making and the use of knowledge to a much larger number of people and institutions. The advantages of decentralization that are already being employed in private companies can then be felt society-wide.

**History**

The first work on a cryptographically secured chain of blocks was described in 1991 by Stuart Haber and W. Scott Stornetta. They wanted to implement a system where documents' timestamps could not be tampered with or backdated. In 1992, Bayer, Haber and Stornetta incorporated [Merkle trees](https://en.wikipedia.org/wiki/Merkle_tree" \o "Merkle tree) to the design, which improved its efficiency by allowing several documents to be collected into one block.

The first blockchain was conceptualized by a person known as [Satoshi Nakamoto](https://en.wikipedia.org/wiki/Satoshi_Nakamoto) in 2008. It was implemented the following year by Nakamoto as a core component of the cryptocurrency bitcoin, where it serves as the public [ledger](https://en.wikipedia.org/wiki/Ledger) for all transactions on the network.

In August 2014, the bitcoin blockchain file size, containing records of all transactions that have occurred on the network, reached 20 GB. 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.

**Features**

## **Decentralized System**

A decentralized system allows users to accumulate assets in a network that can be transferred and received anywhere in the world through the Internet. These assets could be a token, contract, and other important documents. With a decentralized technology, the user has a precise authority using a private key associated with the asset. This is also the kind of system that [Decenternet](http://decenternet.com/white-paper/)uses where it also allows users to experience a speedier, more protected, and more personalized decentralized internet together with your accustomed websites. Anubis is its native blockchain Operating System and is completely free of charge.

## **Distributed Ledger**

A blockchain serves as a [public ledger](http://www.techracers.com/blockchain-key-features)that presents the members’ information and accomplished digital transactions. The blocks that have recorded dealings completely are then counted to form a blockchain.

* **Promotes Safer and Secure Ecosystem**

Blockchain has the ability to analyse and revise itself from time to time which stimulates its self- reviewing process.

## **Mining**

## Mining involves miner that solves a complex mathematical computation. Miners compete with each other because of the reward they can get after deciphering the puzzle. Whoever solved it first, gets the prize.

## Cloud computing

## Blockchain systems frequently involve the use of cloud computing platforms. Cloud computing platforms offer the potential to use large amounts of resources in relation to data storage and also the ability to bring flexible and scalable processing resources to the analysis of data.

## **Advantages**

* **Security**

Well-designed blockchains are more secure than private databases. Not only are there are multiple copies of the blockchain existing throughout the network in question, the more participants in a given network, the less possible it is to modify the contents of the ledger without being caught.

The scenario from the movie Office Space, wherein the characters surreptitiously shave off millions of fractions of a cent, is likely impossible to pull off in a world where the finance industry uses blockchains.

* **Transparency**

While opacity has some place in financial institutions, transparency usually leads to less evil. Blockchains are by and large transparent by design, insomuch as the movement of funds and other data is concerned. For investors this can mean a vastly superior mechanism for overseeing the use of their money. For things like government records and other public information concerns, people gain an incomparable level of trust in the institutions providing data , be it something as simple as the latest revision of a regulation or something as important as a land title.

* **Resilience**

Perhaps the biggest but oft-unmentioned benefit of the blockchain architecture is its resilience in terms of attack. The Bitcoin blockchain, for instance, has millions of copies around the world. As long as a few are left standing, these records are, for all intents and purposes, immutable.

* **Data Sovereignty**

The physical location in which data is stored may be regulated, with the regulations varying from country to country. This is particularly the case for personally identifiable information (PII) and for sensitive data such as health data and financial records. The European Union has particularly stringent regulations that apply to the PII of European citizens. As a result, any blockchain system must take into account data sovereignty rules and store and process data only in those locations permitted by the regulations – this requires that the cloud service provider allow the cloud service customer to control storage and processing locations, as well as backup locations.

**Application**

Blockchain applications are used to present (business) capabilities to end users of the blockchain system. This is particularly the case for business users, where capabilities need to be presented in terms that relate to the particular application area with concepts and processes familiar to those business users. Applications may also exist to serve other users with different roles including administrators, operators, and auditors. Blockchain applications can take many forms including web applications (with code centralized on a server closely associated with the blockchain node), or applications running on the end user device(s), potentially connected to server-side application services. The blockchain applications and services interface with the blockchain platform using the APIs offered by the platform. The applications may have access to other server-side resources such as databases and services, as needed, to implement their capabilities. Blockchain applications are built to benefit the business networks within specific industries including financial services, healthcare, insurance, energy and utilities, public sector, and retail. Blockchain will also enable cross-industry networks to help revolutionize supply chains, secure and integrate Internet of Things (IoT) applications, and reduce cost and risk.

### **Financial Services**

Intermediaries are often needed to mediate the process and resolve conflicts. Naturally, this costs stress, time, and money. In contrast, users find the blockchain cheaper, more transparent, and more effective. Small wonder that a growing number of financial services are using this system to introduce innovations, such as [smart bonds](http://smartbonds.co/) and [smart contracts](https://blockgeeks.com/guides/smart-contracts/). The former automatically pays bondholders their coupons once certain pre-programmed terms are met. The latter are digital contracts that self-execute and self-maintain, again when terms are met.

## **Smart Property**

## A tangible or intangible property, such as cars, houses, or cookers, on the one hand, or patents, property titles, or company shares, on the other, can have smart technology embedded in them. Such registration can be stored on the ledger along with contractual details of others who are allowed ownership in this property. Smart keys could be used to facilitate access to the permitted party. The ledger stores and allows the exchange of these smart keys once the contract is verified.

## Smart Contracts

Smart contracts are digital which are embedded with an if-this-then-that (IFTTT) code, which gives them self-execution. In real life, an intermediary ensures that all parties follow through on terms. The blockchain not only waives the need for third parties, but also ensures that all ledger participants know the contract details and that contractual terms implement automatically once conditions are met.

* **Vehicle registration and maintenance**:

Government regulators can create a vehicle template on blockchain, which is updated by the manufacturer on transfer to the dealer, initial owner and future owners. This could be augmented with other information such as records of maintenance or vehicle theft. Use blockchain as a shared ledger of vehicle history, detailing usage, maintenance, warranty work, and replacement parts.

• **Livestock registry**

Blockchain provides a common ledger for the government, farmers, slaughterhouses, and cattle markets. All parties have access to validated records of livestock, including transactions and movements. Smart contracts define the conditions of transactions/movements according to animal type.

• **Equipment records**

Use blockchain as a shared ledger of equipment history, detailing usage, maintenance, and warranty work and replacement parts.

• **Food safety provenance**

Secure documentation is added to raw material and consolidated onto packaging with aggregation for shipment. Blockchain provides real-time visibility of the food supply chain to distributors, consumers, retail buyer, auditors, and regulators.

**Future Scope**

Blockchain technology used first for bitcoins, has now become one of the hottest tech that could revolutionize the current methods of financial as well as any sector it touches.

Blockchain technology is a decentralized concept where transactions or smart contracts are maintained in a public ledger which is copied all around the world in different nodes. On a single blockchain, every transaction ever made is available. Anybody can check them using blockchain softwares. Transactions are verified by proof of work by miners that check the transactions if they are correct and add them in the next block to be attached in the blockchain.

Blockchain is influencing the market like no one else did. Anybody can use it for any system. With the integration of IOT with blockchain, the system can handle any type of digital goods and communication without any sweat. Iot uses smart contracts and blockchain verifies them with its decentralized network.

**Conclusion**

Blockchain technology offers a secure, fast, and cheaper medium of carrying out online transaction and online transfer of information without the need of third party verification. The adoption of blockchain technology in financial services sector has gained traction. Banking sector is willing to explore opportunities which would make the banking transactions more transparent and easy to process. Increased penetration of digital technology in the banking sector has resulted in the development of easy to use online platforms and applications. This drives the need to carry out the online transactions in a secure manner. Blockchain technology eliminates the frauds due to errors and identity theft to a large extent. Hence the financial services sector has been keen in exploring the technology before undertaking a wide scale deployment of this technology. This technology can benefit industries such as music and healthcare by offering easy access and exchange of digital data of these industries over the Internet.

**References**

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