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IoT and Blockchaining With Its Application And Components

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Abstract: - In this world IoT (Internet of things) is biggest challenge that we see the internet is use in our daily life. IoT is the latest research in computers world. It means internet of things in which humans work with their smartness. IoT is uses in different sectors like health care, farming, self-driven cars, smart-homes, smart cities etc. It is a communication between device and human with the use of internet. In healthcare sector IoT is communication between a doctor and a patient. It provides the security of patient. IoT with the use of block chaining provide the major security. With the use of IoT and block chain we build the trust in transaction data. It can find the scam calls, messages like google pay find the scam transaction. It provides the greater flexibility with the cloud computing. We used the transaction with card with the uses of IoT and the block chaining we use the transaction without pin we used the visa card which use the AI and IoT in which sensor are used .so in our daily life we used the IoT and block chaining is make our challenging. We discussing the IoT and block chaining challenging in our daily life.

1.1 Introduction: - IoT is the biggest challenge in our life it provides the huge opportunity for many players in all businesses and industries. Many companies focus on IoT and the connectivity of their future products and services. IoT use cases is creating smarter, more efficient cities, energy grids it can be check to balance workloads, traffic lights could be synced for traffic conditions in real-time A very large chance for many players in all business and industries [1].

It divides into three categories: -

1. Technology
2. Business
3. Society

1.2 Technology: - In this part of IoT systems function smoothly as a standalone solution or a part of existent system. In which cloud Security Alliance(CSA) listed some of the root causes of such technologies challenges: -

Many IOT Systems are poorly designed: - It create a complex configuration.

- Lack of standards for authentication.
- Lack of mature IoT Technologies and business processes.
- Limited off life cycle maintenance and management of IoT devices.
- Limited practice available for IoT developer.

1.2.1 Security: - IoT has already provide a serious security that concerns has drawn the attention of important tech Firms and government agencies across the world. In this world hacking of baby monitoring smart fridge drug infusion pump camera and rifles are signifying security nightmare. there is new node have been added to the networks. [2]



Figure 1 : Technical Challenges[2]

In this attack comes among between to enhance the cyber-security fears and an uprising number of internet security division.

1.2.2 Connectivity: - It is connecting with many devices that is biggest challenges for the future of IoT and it will defeat the structure of the current communication model. This model is enough for the current running IoT system where thousands devices are involved. When billions of network and thousands of devices are organized system into turn into a gridlock.

1.2.3 Compatibility: - It grow up with many technologies become more competing to become the standard [2].

1.2.4 Standards: - In which we used different protocols like communication, network and data aggregation standards and sum of standards and sum of activities handling, processing and stored by sensors. It increase the value of data, the scale, scope and frequency of data available for analysis [2].

1.2.5 Actions:-IoT implementation is extracting insights from data for analysis, where analysis is driven by cognitive technologies and the accompanying models that facilitate the use of cognitive technologies [2].

1.3 Business: - It is the biggest motivation for starting, investing in operating any business, without a sound and solid model for E-commerce, vertical Markets, Horizontal Markets, Consumer Markets. But these markets are suffered for regulatory and legal security. In these markets end –to-end solution providers in vertical industries. It is important to understand the value of chain and business model for IoT. It divided into three categories: -

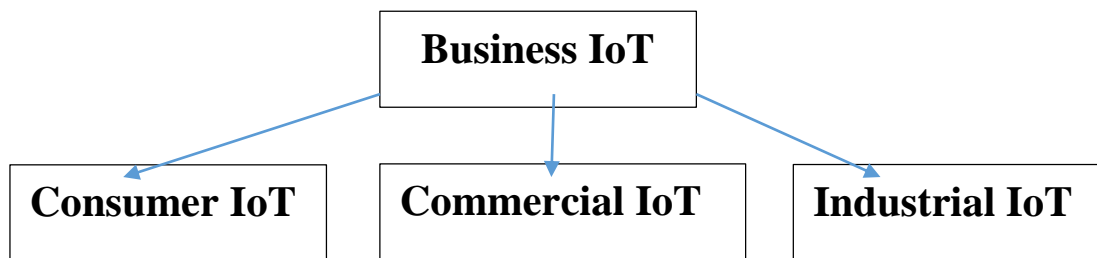


Figure 2: Business Model

- **Consumer IoT:**-It includes with devices such as smart-card, phones, watches, Laptops and entertainment systems.
- **Commercial IoT:** - It include with different devices, trackers and connected medical devices.
- **Industrial IoT:** - It include with electric meters, waste water system, pipeline monitors and other type of connected industrial and system.

1.4 Use of IoT in many sectors: -

1.4.1 Agriculture: -Use of IoT in the field of agriculture is great. IoT technologies are used in agriculture to provide every necessary information related to plants growth and their diseases and early anticipated changes. The smart agriculture, it denotes the application of IoT that uses the sensors to collect environment machine matrices and the data help the farmers for livestock to crop farming. [5]

IoT use Cases in Agricultural Process: -

- i. Agricultural Drone.
- ii. Green House Automation
- iii. Monitoring the climate Conditions
- iv. Cattle Monitoring.

1.4.2 Energy:-It has started restructure most aspect of the energy sector from generation to transmission for distribution for company and customers interact.

There are many areas in energy sector: -

- i. Remote assets monitoring and management.
- ii. Process optimization grid balances
- iii. Load forecasting
- iv. Smart decision making
- v. Innovative power solutions.

1.4.3 Smart School: -Smart schools IoT use Smart School for better controlling of the campus blocks activity. In this student's monitoring is proposed using an IP-Based CCTV camera system with ability to detect and recognize and ability to. People. It used with the support use of beaci chips as student identity system can simply problem of face identification, thumb identification to face and thumb identification. [3].

1.4.4 Smart Homes: - IoT in smart homes provide users to manage the household things in different wave different pencils of a curator device are used for control their household object it also provides better facility for house security this system provide facility to various project to communicate with each other. It controlling the home access technologies which are commonly used for public access doors. In which sensors are used in refrigerator, identification cards are also by RFID CARD and reader which scan the id [4]. In this sensors are used to collect the internal and external home data. The sensors collect the data with LAN (local area network).

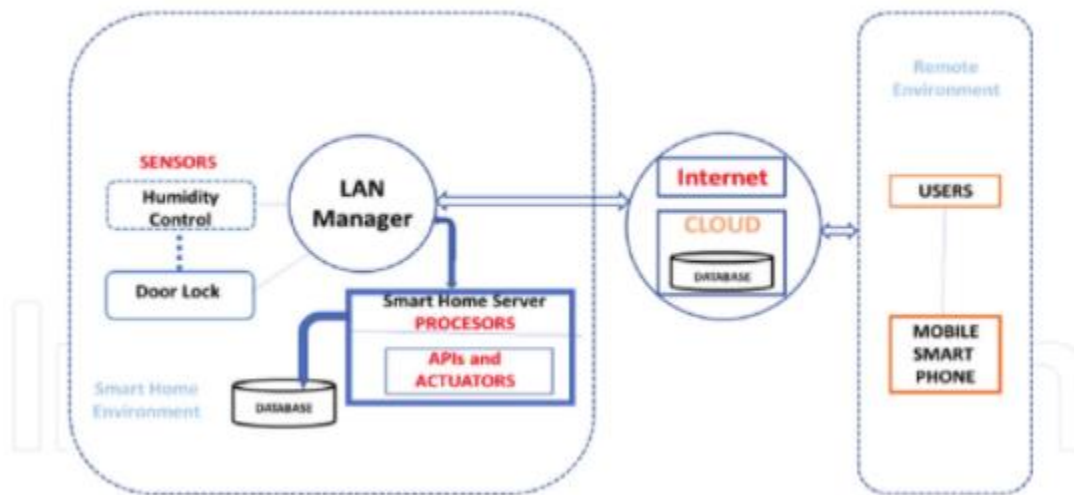


Figure 3: Iot and Smart home Automation[4]

1.4.5. Health Care: - In which provide various facilities which are very helpful in Healthcare services and use for better corporate operations in IoT there are many technologies available that are used for monitoring patient health. In health care IoT based healthcare system are capable of detecting free crude and treatment of various Healthcare sub system IoT system which provide better service subsystem like: -

- i. Healthcare pan
- ii. EHR system
- iii. Smart medicine
- iv. Community based HR
- v. Smart emergency.

1.4.6. Industries: - IoT in industries is a rapidly developing area. IoT has an important part in our life. It connected with the internet idea is continuously evolving in content, areas of application, technology. In the new real life and the industrial projects have been done oriented industries and government based industries. Like industries in Germany have been started. these type of industries has been biggest economics.

IoT application form the value creation for industry and brings together expert opinions from academia, research and industry. The industry application is highlighted as a related to industries applications and perform specific technology.

1.5 IoT applications benefits: - it is value creation in an industrial environment may have its origin in different aspects and depending on the application type are.

- i. Value from visibility identification, location tracking
- ii. Value for IoT supported safety in hard industries environment
- iii. It provides the right information for collecting
- iv. It reduces production loss
- v. It reduces energy consumption
- vi. It provides new type of maintenance and approaches
- vii. IoT application presented in three major areas are: -supply chain, future industry, services and manufacturing.

1.6 Challenges of IoT: -

- i. Security: -it provides the security from cyber threats and provide entire security strategy to the company.
- ii. Scalability: - It connected with huge network, large volumes of data to be processed
- iii. Energy efficiency: - it provides less energy efficiency when more people work in same sectors
- iv. Bandwidth management: - in which technologies areas need to converged to established a common frame work
- v. LoC: - in which lack of government support comes for security and safety of people.
- vi. Modeling and analysis: - In this challenge design challenge and model challenge increased .it provide limited energy.
- vii. Infrastructure: It does not take the benefits to the technology due to poor communication it mostly used in agriculture
- viii. High cost: - IoT in many sector is very high cost. E.g:-farmer's in agriculture field to be with more than thousand dollars.
- ix. Data storage: - it provides limited storage
- x. Data analytics: - data analysis of IoT is not cleared by all
- xi. Complexity and management: - difficult to manage it
- xii. Intermittent Connectivity: - IoT devices not connected always. sometimes these devices are design to always connect periodically sometimes it is unable to connect because of connectivity issue and sometimes quality of services issue they are dealing with interface on a wireless network using a share spectrum and it was available solution to provide uninterrupted services that should be critical factor [6].

2.1 Block chain: - it is a chain of block which contains information is stored inside a block depend on the type of block chain. It records the system of information in a different way it is difficult to hack, cheat the system. It is a digital ledger of transaction which is duplicated and distributed across the network.in block chain each block in the chain contains a number of each transaction and evert time new transaction occurs on the blockchain this record is added to every participate ledger.

2.2 Role of Blockchain in IoT: - Block chain in the IoT is act with decentralized, distributed, public and real time ledger to store transaction among IoT nodes. Every block has the cryptographic hash code, previous code. The block is linked with each other and every device has its previous device address. The block chain and IoT together work in the framework of IoT and cloud computing integration.

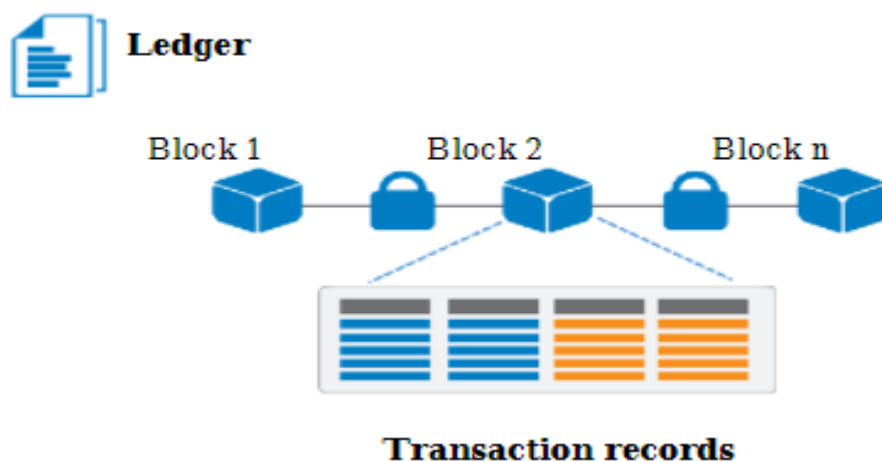


Figure 5: Concepts of Blockchaining

2.3 Blockchain components use in IoT: -

2.3.1 Hashing: - hashing function used to calculate the unique fixed the output for input of crossing of closely any size. A cryptographic Hash Function of blockchain Technology in used for many operators.

2.3.1 Transaction: - in every block of blockchain there are multiple transaction available the transaction contains each information about the transfer of asset behave different parties.

2.3.2 Ledger: - it is collection of transaction it contains the current world state of blockchain transaction.

2.3.3 Consensus Network: - it is set of data that maintain duplicate ledger. System management it is used for maintaining the super system of blockchain

2.3.4 Autonomous: - In block chain, all the IoT nodes are free to communicate with any node in the network without centralized System.

2.3.5 Scalability:-

In block chain, the IoT device will communicate in high available a distributed intelligence network that connect with destination device in a real time and exchange information. [8]

Role of block chain in IoT: -

- Physical things
- Gateways
- Networking
- Cloud
- Iota
- Notify
- Iexce
- Xage
- Sonm

3.1 IoT with block chaining give us more opportunities: -

- Reduce the cost
- Reduce time
- Social services
- Security services
- Financial services
- Risk management
- Building the trust between parties.

3.2 Block chaining challenges and issues: -

A part from the traditional challenges space contain any another attacks like majority attack, distributed, Denial of services, wallet etc.

3.2.1 51% (majority attack): - 51% attack can occur when participate of block chain able to control more than 51% of the mining power when 51% computing power is hold by someone, then it can control the block chain and after this attackers can be able to modify the transaction data in the block chain.[12]

3.2.2 Distributed denial of services:- Every network resources has then capacity limit and this type of attack to took advantages of these limit and send multiple request to attacked web resources and search the correct functionality of the website .

3.2.3 Wallet attack: - A special key is assigned to wallet software. these keys are very important and the theft by someone unauthorized person it become the difficult escape computer from attack.

4.1 Block chaining application: -

4.1.1 Money transfer and payment processing: - Attention the most ideal and relation and rational application of blockchain Technology using it is as a mean to accelerate the transfer of funds from one party to another most asked actions carried over by a blockchain can be settled within a matter of seconds while Bank take 24 hours today and Evil 7 days a week.

4.1.2 Supply chain monitoring: - Block chain technology is easy to apply when it come on in supply chain are paperboy enterprise are able to support in efficiency within their supply chain separately as well as to detect items in real time blockchain also enable enterprise and even customer to perceive how product perform from a quality control point of view as they move from their place you are of origin to relate to the retailer.

4.1.3 Digital id's: - More than 1 billion people around the Global face challenges related to identity issues Microsoft is looking to older that it is the joining digitally ID at application that are currently used by median of people in this world which would give us a way to control and manage their digital identity to assess the financial services or begin their own business.

4.1.4 Sharing of Data: - Cryptocurrency has introduced a beta version of its data market place in November explain the block chaining could be used as market place to share or sell data that are unused the Tata to enhance a mass of industries.

4.1.5 Digital voting block chain: - It provides the ability to vote digitally and it is transparent enough that any regulator would be able to see something was altered on the network it integrate the is of digital voting with the immutable of blockchain to make the vote really count.

4.1.6 Food safety application: - In this blockchain Technology in able tracking food from its origin to the plate 6 blockchain data is unchangeable one is able to track the transport of food product from their origin to the supermarket.

4.1.7 Unchangeable Data backup: - Block chain technology is the ideal way to backup data in cloud storage system are created to be go to source from data safekeeping problems using the blockchain a backup source for cloud data center for any data cloud set that issue.

4.2 Features of block-chain: -

- Transaction Fees
- Easy transfer
- Know your customer rule
- Privacy
- Security

Approve transaction as

4.2.1 Security of Blockchain: -

Block-chain is a risk management system for a block-chain network, using cyber-security, frame-work.it assures services and best practices

To reduce for risk against attack and fraud it produces the structure of data and security qualities. It is based on the principal of cryptography. Conesus and ensure trust in transactions. In which data is structured it into blocks and each block contains a transactions or bundle of transactions. Each transaction is valid and true. It is a technology that enable decentralization of members across a distributed network in blockchain it is a failure and the single user cannot change the record of transaction it provides different security expect types of Blockchain security it provides two type of security private and public technologies in Blockchain: -

4.2.2 Public Blockchain:- it is a network that typically a lo and even to Join openly free of cost public blockchain uses interconnected computer to valid transaction and Consensus.

example of Public block chain Bitcoin. Bitcoin is valid for all and open for all free in which in which Bitcoin a person easily buys or sell there Bitcoin it create a valid ID proof for the transaction and a self-control in the type of transactions.

4.2.3 Private Blockchain: - identity proof to confirm membership privileges and department for organization to join. only for members And given the private access to their private members it is a network that a achieved consensus By a process called selection process

It is valid transaction in which only private members with special and permission maintain the transaction ledger it provides more control it is a restricted and limited to business goals. [7][9].

4.2.4 Hacking in a Block chaining: - Thief stolen money in block-chain by every detail of designs and implements execution of the network. It is a cryptographic database maintained by network of computer is up to date version of set of rules that check how computer in the network hold notes. Set up correctly the system can made it different and expensive to added for transaction but easy to verified and valid for everyone.

4.3 Decentralization in the Block-Chain: - Block-chain technology share any of its information in the central location the block-chain is copied and spread across a network of computers a new block is added to the block-chain every computer on the network update is changed to reflect the changes by separating the information across the network rather than the story on one Central database blockchain become more difficult to tamper with copy of block-chain fell into the hands of hacker only a single copy of information rather than the entire network would be compromised .

4.4 Decentralized Applications. Decentralized applications are the main and the important part of the Blockchain. It is deal with all the problems that come with the centralized system. In block chain the decentralized architecture works as the user invokes the smart contracts. In this smart contract is an automatic computerized protocol which used for digitally facilities, substantiate, or apply a legal contracts arrange or representation are avoiding intermediates and directly validating the contract over a decentralized platform. [10]

Advantages of decentralization are: -

Independence:-It provides impendent facilities to all.

Conviction:-It provides the trust and security to all you document that are saved in blockchain.

Support:-In blockchain it is only providing the duplication a stored in different location.

Correctness: - it is error free and provide faster and low cost facilities.

5. Conclusion: -

Internet of things is a new internet application which leads to an era of smart technology where there exist thing-thing communication rather than human -human communication .Through IoT each and every object in this world can be identified ,connected and take decisions independently .technologies such as RFID(Radio Frequency Identification) ,wireless sensor networks and embedded systems play a vital role in forming an IoT application .It is used in many applications in healthcare ,agriculture ,smart buildings, transportations etc. Though IoT is used in many domains, its path to success is not smooth. There are many privacy and security issues that needs to be addressed if these issues are addressed then internet of things will definitely be the global mantra. Blockchain technology is a great adoption for digital identifiers. It offers renouncement, backup, security and decentralized management. Block chain technology could be very supportive for upcoming world that use both centralized and decentralized models. In IoT and Block-Chaining different types of applications which used in our future which is used by wireless sensors.

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