

## **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

#### **An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

### **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

#### **COURSE NAME: 19CS622-Blockchain Technology**

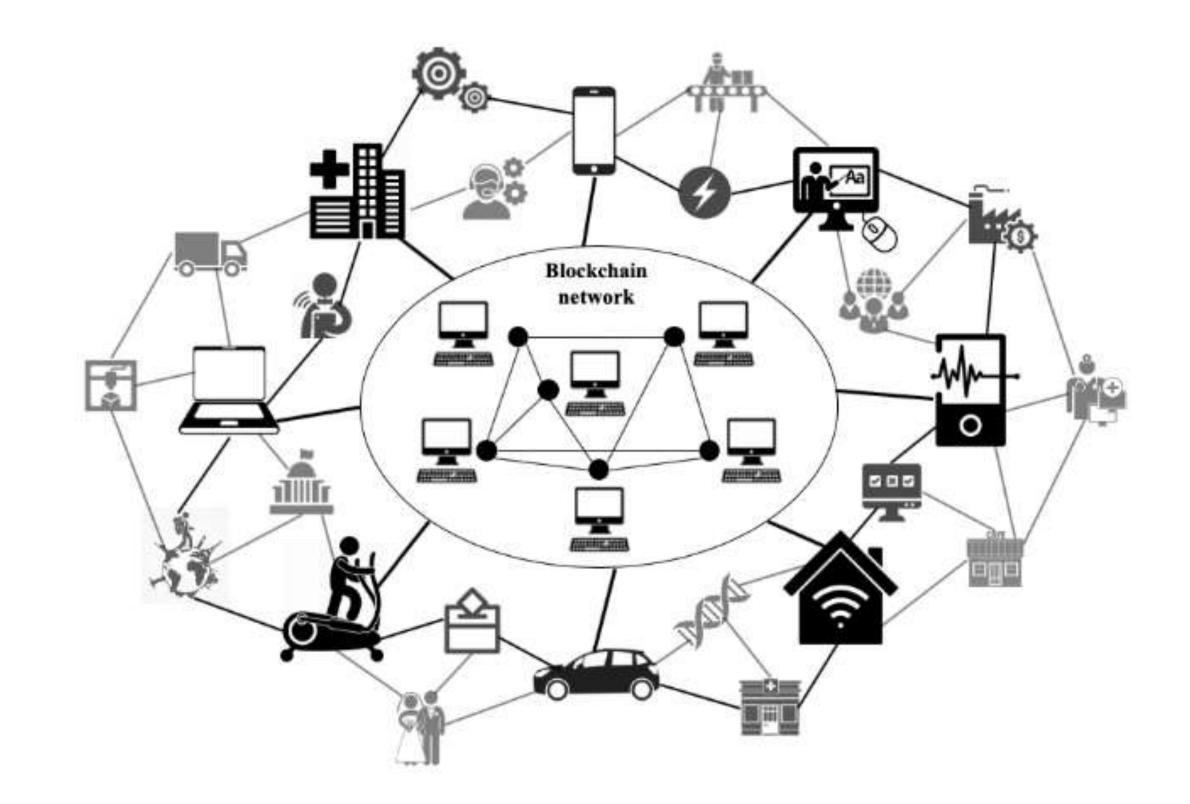
III YEAR /VI SEMESTER

**Unit 1- INTRODUCTION TO BLOCKCHAIN** 

**Topic 5**: Decentralization in Block Chain











# **Centralized vs. decentralized blockchain**

	Centralized	
INFORMATION FLOW	To and from center	
DECISION-MAKING	Usually hierarchical	
CONTROL	Central entity	
PROS	Simpler decision-making, less expensive hardware, more control	Immu
CONS	Single point of failure, trust issues, data silos	Ano more exper
EXAMPLES	Binance, Coinbase	I



#### Decentralized

Multiple routes

Democratic

Software code

utability, transparency, member-owned

nonymity for criminals, ensive hardware, user conflict

Bitcoin, Ethereum





# DECENTRALIZATION

- Decentralization is the distribution of functions, control and information instead of centralizing them in a single entity.
- Blockchain decentralization refers to the distribution of power and authority across a network of computers or nodes that collectively maintain and validate a blockchain.
- In a decentralized blockchain network, each node has a copy of the entire blockchain and participates in the consensus mechanism to validate and verify transactions.
- This consensus mechanism ensures agreement among the nodes about the validity and order of transactions, promoting trust and security within the network.





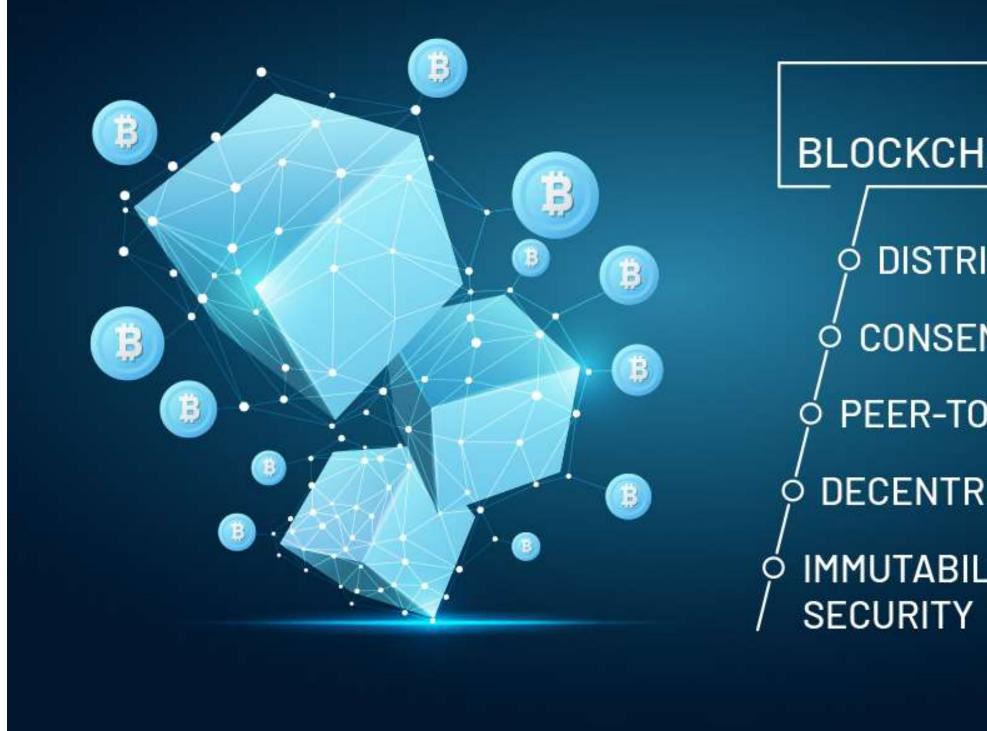
# **Types of decentralization in blockchain**

- Fully centralized. Entirely controlled and managed by a single, central authority.
- Semi-decentralized. Controlled and managed by multiple authorities.
- Fully decentralized. No middlemen or central authorities to manage or administer the network.









19CS622-BLOCKCHAIN TECHNOLOGY/ Decentralization in Block Chain/ MR.GIRISH.R CS<mark>E,SNSCE</mark>



### HOW IS A BLOCKCHAIN DECENTRALIZED?

- DISTRIBUTED LEDGER
- **CONSENSUS MECHANISMS**
- PEER-TO-PEER NETWORK
- DECENTRALIZED GOVERNANCE
- IMMUTABILITY AND CRYPTOGRAPHIC



## Advantage of Decentralization in Blockchain

- **Distributed Ledger**: The blockchain's ledger, which contains a record of all transactions, is replicated ulletand stored across multiple nodes in the network.
- **Consensus Mechanisms**: Decentralized blockchains utilize consensus mechanisms to agree on the  $\bullet$ validity and order of transactions.
- **Peer-to-Peer Network :** Each node communicates with other nodes to propagate transactions and  $\bullet$ blocks, maintaining the integrity and consistency of the blockchain.
- **Decentralized Governance**: This allows stakeholders in the network to have a say in the governance  $\bullet$ of the blockchain, reducing the centralization of power.
- **Immutability and Cryptographic Security:** The use of cryptographic algorithms ensures the ulletintegrity and security of data stored on the blockchain.







## Advantage of Decentralization in Blockchain

- **Security:** With no single point of failure, decentralized networks are more resilient to attacks and ulletcensorship attempts.
- **Transparency:** Blockchain's decentralized nature enables transparency as anyone on the network • can view the transaction history and verify its integrity.
- **Trustlessness**: Decentralization reduces the need for trust between participants, as the consensus  $\bullet$ mechanism ensures the accuracy and validity of transactions.
- **Ownership and control:** By eliminating intermediaries, decentralization allows individuals to have  $\bullet$ direct ownership and control over their assets and data.
- It provides greater autonomy and reduces reliance on centralized institutions.







# Disadvantages of Decentralization in Blockchain

**Scalability:** As the network grows, the computational and storage requirements increase, which can lead to slower transaction processing times and increased resource demands.

**Governance and Decision-Making:** Decentralized blockchains typically involve a distributed community of participants who collectively make decisions through consensus mechanisms.

**Network Security:** Distributed networks may be susceptible to attacks such as 51% attacks, where an entity or group gains control of the majority of the network's computational power and potentially manipulates transactions. **User Experience and Responsibility:** Decentralized blockchains often require users to manage their private keys and handle their own security. **Regulatory Challenges:** Decentralized blockchains can pose challenges for regulatory authorities as they lack a centralized governing body.

**Energy Consumption:** Some decentralized blockchain networks, particularly those that rely on proof-of-work consensus mechanisms, consume significant amounts of energy.

**Upgrade and Protocol Changes:** Implementing changes or upgrades in a decentralized blockchain can be challenging due to the need for consensus among network participants. This can result in slower development cycles and delays in adopting necessary improvements.



## **References**



#### **TEXT BOOKS**

- Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas M Antonopoulos 2018 1.
- Imran Bashir, "Mastering Blockchain: Distributed Ledger Technology, Decentralization and Smart Contracts Explained", Second Edition, Packt 2. Publishing, 2018.
- https://101blockchains.com/blockchain-vs-database-the-difference/ 3.

#### **REFERENCES**

- William Mougayar, "Business Blockchain Promise, Practice and Application of the Next Internet Technology, John Wiley & Sons 2016. 1.
- Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', Create Space 2. Independent Publishing Platform, 2017.
- Arvind Narayanan, "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction", Princeton University Press, July 19, 2016. 3.
- Henning Diedrich, Ethereum: Block chains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations-2016 4.

### **Thank You**

