



# **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	Decentralized
INFORMATION FLOW	To and from center	Multiple routes
DECISION-MAKING	Usually hierarchical	Democratic
CONTROL	Central entity	Software code
PROS	Simpler decision-making, less expensive hardware, more control	Immutability, transparency, member-owned
CONS	Single point of failure, trust issues, data silos	Anonymity for criminals, more expensive hardware, user conflict
EXAMPLES	Binance, Coinbase	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.



## HOW IS A BLOCKCHAIN DECENTRALIZED?

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



# Advantage of Decentralization in Blockchain

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

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

## REFERENCES

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

# Thank You