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 TECHNOLOGY

COURSE NAME: 19OE201-Blockchain Technology

IV YEAR /VII SEMESTER
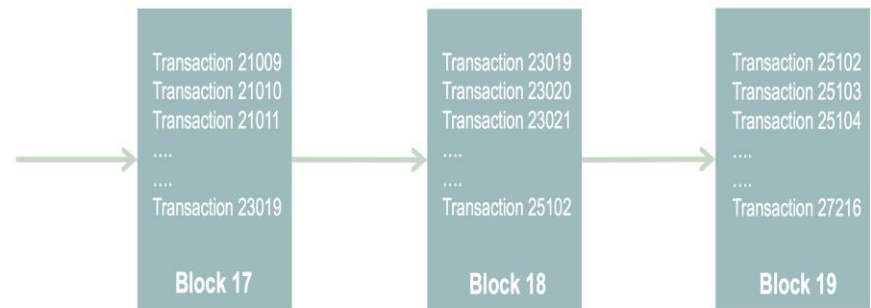
Unit 5 – Blockchain Applications

Why blockchain?

Blockchains are an emerging technology pattern that can radically improve banking, supply-chain and other transaction networks, giving them new opportunities for innovation and growth while reducing cost and risk.

Economic transactions on a distributed ledger can be programmed to record virtually anything of value: your identity, a will, a deed, a title, a license, intellectual property, and also almost any type of financial instrument.

"How seriously should we take this? I would take it as seriously as we should have taken the concept of the Internet in the 1990s."

Secure and trusted record keeping

By design, no one party can modify, delete, or even append any record to the ledger without the consensus, making the system useful for ensuring the **immutability of transactions, contracts, and other legal documents**.

Transaction 21009	Transaction 23019	Transaction 25102
Transaction 21010	Transaction 23020	Transaction 25103
Transaction 21011	Transaction 23021	Transaction 25104
....	....	....
....	....	....
Transaction 23019	Transaction 25102	Transaction 27216
Block 17	**Block 18**	**Block 19**

Blockchain

| Transaction	Block	Blockchain
Inputs from network participants that describe changes in asset control, or insertion of contracts and/or related legal documents.	Among other things, a block contains a list of validated transactions defined around the time frame when the block was created.	A **record repository** of ordered collection of blocks. It records the **history** of asset control and state changes, as well as creation of contracts and legal documents.

Reduce costs and complexity

Blockchain technology offers a way for market participants to access dematerialized assets **directly** without always going through other participants needlessly

Centralized Repository (today's system): most participants are disconnected from their asset depository, settling transaction would require participants to collaborate in a flow that is **slow**, **inefficient,** and **expensive**
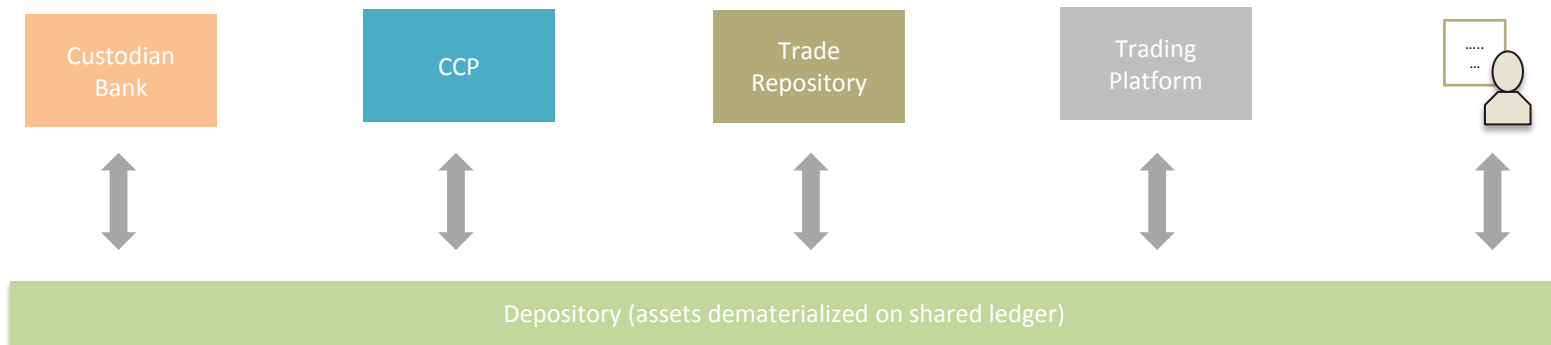

Shared Repository: all participants can interact with depository directly without going involving third parties, potentially making post trade operations **cheaper** and **faster**

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Financial Industry Applications best suited for Blockchain

- Financial Instruments
  - Payments – Cross Border, P2P, Corporate and Interbank
  - Private Equity
  - Bonds
  - Derivative commodities
  - Trading records
  - Spending records
  - Mortgage/Loan records
  - Microfinance
  - Servicing records

- Stack of Processes
  - Clearing Networks
  - International Transfers
  - Clearing and Settlement
  - auditing, reconciliation, reporting, settlement
  - Asset Ownership

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Blockchain for Financial Market

Trading, clearing, and settlement functions can all be automated on a blockchain network using smart contracts and oracles.

Market **Clearing/Settlement** **Oracles**
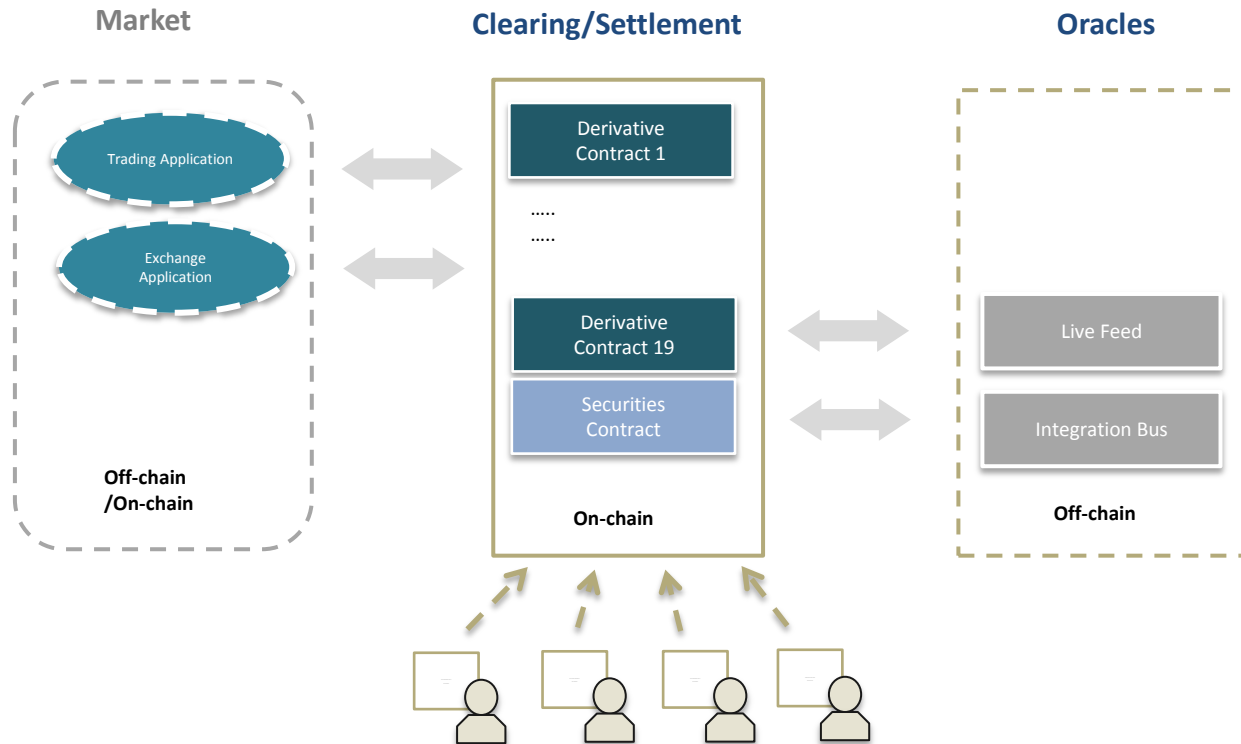
Market	Clearing/Settlement	Oracle
Trading/exchange applications can live either on-chain or off-chain (i.e. off-chain applications are often more centralized, but likely offer better latency).	Final clearing/settlement of financial assets can be automated through smart contracts, which have direct access to assets defined on chain.	Oracles are off chain services that integrate on-chain contracts with existing systems; network participants do not interact with oracles directly.

Diagram elements:

- Market (Off-chain/On-chain): Trading Application, Exchange Application
- Clearing/Settlement (On-chain): Derivative Contract 1, ..., ..., Derivative Contract 19, Securities Contract
- Oracles (Off-chain): Live Feed, Integration Bus

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IBM – Financial Services use cases for Blockchain

Blockchain for Banking
Letters of Credit As a bank handling letters of credit (LOC) for my clients, I need a common ledger that allows me and all counter-parties to have the same validated record of transaction and fulfilment of conditions, so that we can increase trust and speed of execution from 4 days to <1 day. If we can drive out 99% of the time and cost, we can offer innovative LOC solutions for a wider range of clients, including start-ups that are "born global.
Corporate Debt As a bank handler of corporate debt, I need a Blockchain based system so that I can pay vendor invoices for my corporate client immediately and win the highest NET discount while immediately letting my client validate that the invoice was executed and the money paid, and also so that I don't need to build another system for innovative factoring use cases and government oversight measures — one API for all. I want to do this at a market-level, so that I don't have to build one for each of my client relationships, and so that I can spread the cost of building and maintaining the system.
Repurchase Agreements As a repurchase agreement trader, I need a transparent marketplace of bids and asks, so that I can discover, trade, and execute agreements with relative assurance that there will be no repudiation or other issues. I don't want to have to be subject to the string of counterparties exerting control over the market; rather, I want to be an equal partner in the network, trade directly, and spread the costs/risks.
Supply Chain and Self-Executing B2B Contracts As a corporate buyer, I want to be able to submit my purchase contract to a network I share with the supplier, which will convert the agreement into a validated, trusted, self-executing process, so that when the PO is appended to the ledger, supply has been received, and other events occur, the terms of the contract are automatically executed, and both the suppler, me (the buyer), our banks, logistics partners and other stakeholders all can have visibility and be assured of proper completion of the transaction.

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IBM – Financial Services use cases for Blockchain

Blockchain for Banking Consortia	
Security Services	**Security Settlement:** Once financial assets are dematerialized on a shared ledger, all stakeholders will have direct access to the asset depository and the power to settle trades, without always going through intermediaries needlessly. **Post Trade Operation:** Post trade processes such as trade capture, enrichment, confirmation/affirmation, clearing, and settlement can be automated on shared ledger, potentially reducing post trade operation time from days to seconds. **Trade Repository:** By design, Blockchain is a secure record repository of ordered collection of financial transactions. It records the history of asset control and state changes, reducing the need of maintaining a separate trade repository for record keeping.
Capital Market	**Derivative Trading:** Connect potential buyers and sellers on a decentralized network. Offers placed on Blockchain network can be automatically seen by all participants, the network will be cheaper and potentially bigger than ECNs today because the risk and cost of maintaining the network is spread across all participants (there will not be a single owner charging premium for maintaining the service. **Derivative Post-Trade Management:** Derivatives contracts can be managed and automated through smart contracts on shared ledger, significantly cutting down the management cost and time while reducing the intra-day risk. **Syndicated Loan:** Help borrowers and arrangers to broadcast their offers to all potential investors on a Blockchain network, and to automate the syndication process.
Trade Finance	**Cross-Currency Payment:** Automatically connecting market makers and bypassing intermediaries to significantly reduces time taken for cross currency payment from days to seconds.
Card Operation	**KYC:** Creditor card issuers can record customer credit histories on a shared ledger so that customer information can be easily shared (or sold) between companies.

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Thank you