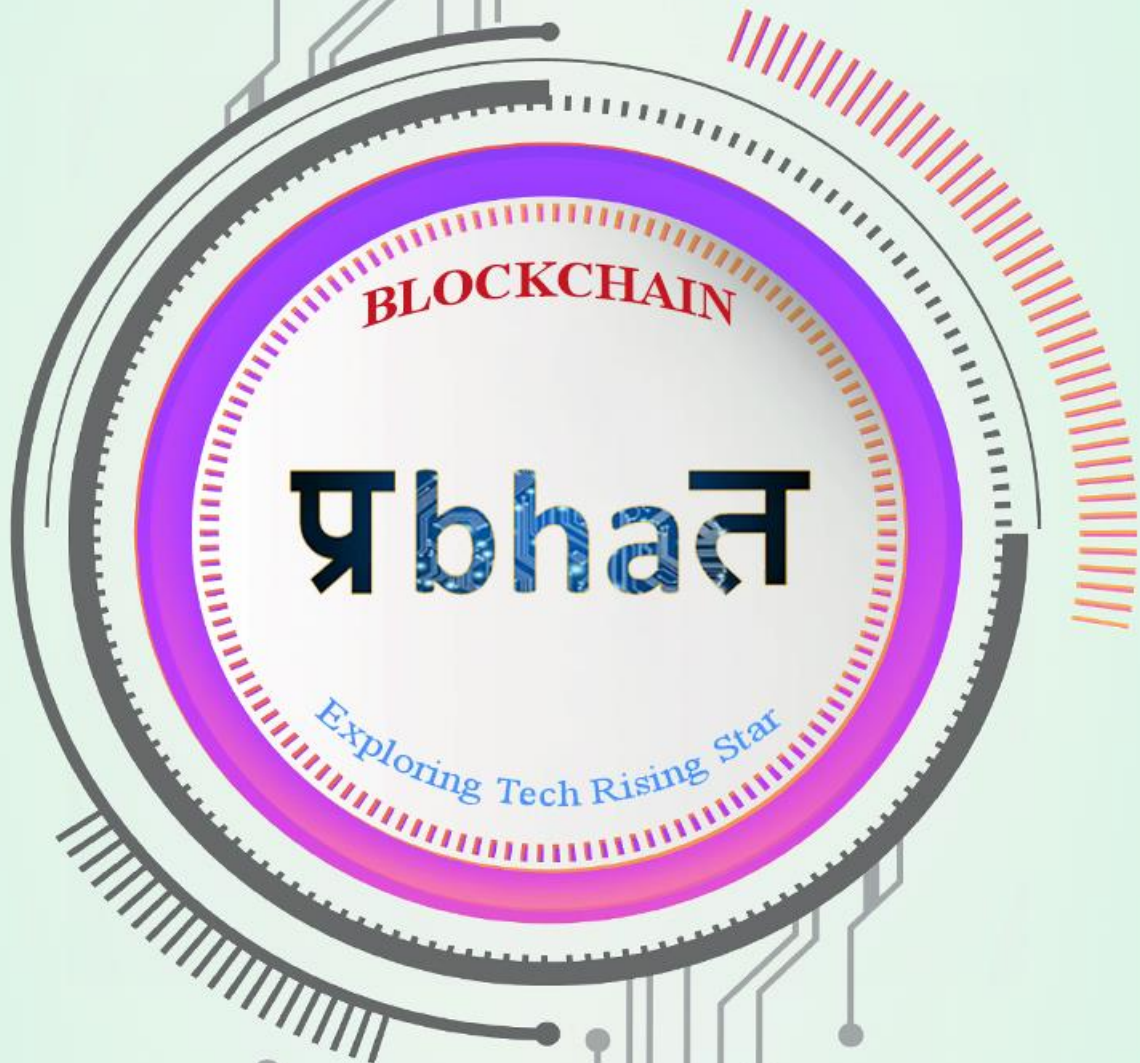


Newsletter 2022 Issue I



**Bharati Vidyapeeth's
Institute of Management and Information Technology
Navi Mumbai**

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INSTITUTE OF MANAGEMENT AND INFORMATION TECHNOLOGY
NAVI MUMBAI**



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BVIMIT fortifies student's intellectual awaking and social transformation in different spheres that makes them to contribute to the organization and world as well. We strengthen student's hard work and commitments towards knowledge.

BVIMIT provides MCA, VI semester course enables overall development of students and give a different perspective towards corporate life.

Current newsletter entitled "***PRABHAT-exploring tech rising star***" is a combined effort of students and staff members that commences articles on emerging technologies with theme as "**BLOCKCHAIN**" provides articles for the same.

I hope "**PRABHAT**" will take you to the world of prominent technologies.

Editorial Desk



Dr. Pratibha Deshmukh
Editor-in-chief

It is indeed a great honor to be the Newsletter Editor for me and also an immense pleasure to launch the first edition of BVIMIT Newsletter “PRABHAT- exploring tech rising star”.

As we are living in the technological era, we have selected the topic for the article as “**BLOCKCHAIN**” to make students aware about this emerging technology. It aims to be a truly interdisciplinary platform seeking to bring together a range of diverse voices on the topic in order to stimulate discussion.

A huge thank you to all the students who contributed writing the articles, without which there wouldn't have been this newsletter.

I appreciate PRABHAT student members for their everlasting support throughout the creation of this edition.

I hope “**PRABHAT**” will convey some technical knowledge to you.



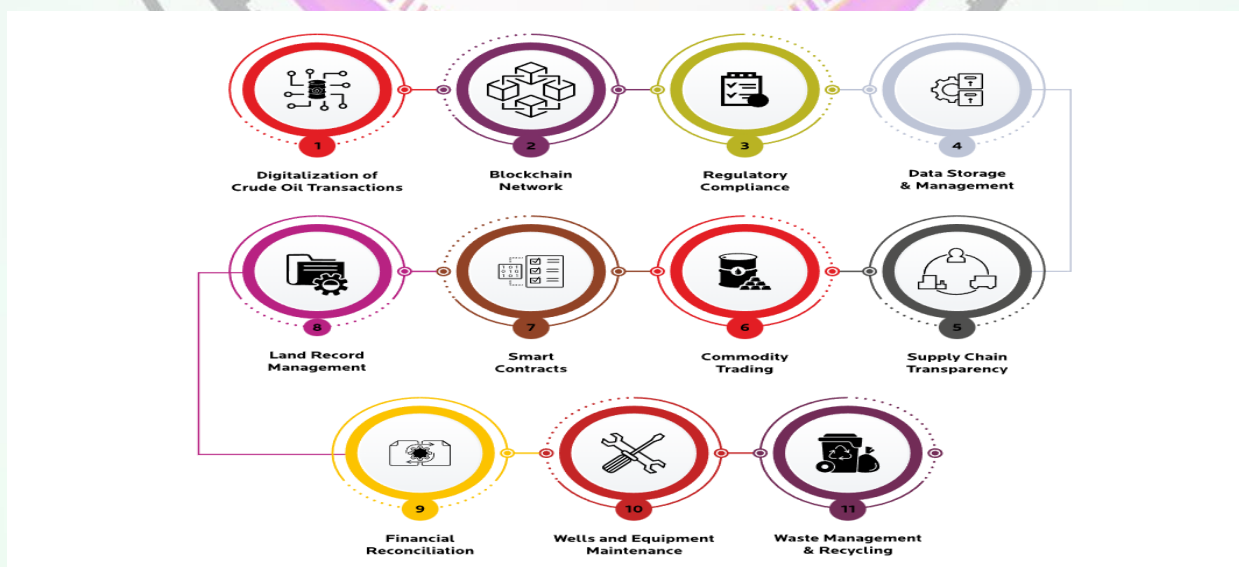
Pranav Chougule
MCA Student

BLOCKCHAIN FOR CRUDE OIL SUPPLY CHAIN APPLICATION

Introduction

Blockchain is an emerging technology with many interesting use cases in oil and gas. For example, as the sector uses more sensor technology, blockchain can store transactions and accounting data directly on these devices, which can reduce process time by connecting assets directly to services contracts. Blockchain can also transform contracting by providing a secure form of collaboration. Oil & gas operations are highly complex due to their vast supply chain spread across the globe, involving physical side suppliers, producers, and distributors. The logistics chain requires support streams for invoicing, documentation, and regulatory requirements. This enormous supply chain footprint can ultimately slow down the operations, such as transaction approval, as it involves multiple stakeholders operating in different time zones. These challenges have triggered companies to identify ways to optimize supply chain and transaction processing. Three U.S. oil-company groups including Chevron and Exxon have teamed up to become the first blockchain consortium for the sector.

BC Technologies and benefits



#1 Digitalization of Crude Oil Transactions

The complex nature of the oil & gas industry involves multiple stakeholders and partners throughout the value chain, and each of the suppliers maintains their ledger in compliance with their policies and procedures. This makes most business transactions inefficient because of the duplication of a single contract by each participant in the supply chain. It is expensive because the duplication of effort and the need for third-party validation of transactions escalates the administrative cost of doing business and makes it vulnerable to cyberattacks because suppliers maintain their records.

Blockchain facilitates embedding the contract in the transaction database for asset transfer. The contract is executed only once it is validated and deployed by all the parties. All ledger transactions require consensus across the network, where the origin of the information is not subject to ambiguity and accessible to all participants, making transactions immutable. Blockchain offers an easy way to transfer information and automatically tracks each transaction. It enables some accounting, finance, and compliance tasks to be automated, reducing operating expenses and the frequency of transactional errors. Commodity markets also benefit significantly by shifting to Blockchain payments and reducing the cost of payment transactions.

#2 Blockchain Network

Major oil & gas industry players are employing Blockchain networks to drive forward unprecedented efficiencies with smart contracts, reduced market friction, and eliminating the need for intermediaries to carry out operations seamlessly. Each node in the Blockchain network contains the same information, implying that once a transaction is committed on that network, it is practically impossible to change the history of that transaction, as all parties in the network would need to agree to make the change, confirming every historical record is the golden copy.

#3 Regulatory Compliance

One among the most heavily regulated globally with protocols deriving from various regulatory authorities from environmental to taxation, oil & gas companies have to comply with many stringent norms. Through Blockchain, regulatory authorities are better equipped to maximize visibility in the industry because the Blockchain network stores all the transactional data, which can be accessed in real-time.

When it comes to regulatory supervision, with its increased transparency and better reporting streams, blockchain technology complies with all three reporting frameworks: the Extractive Industries Transparency Initiative, the European Union directives, and the Dodd-Frank Act. Additionally, sharing certificates, attestations, and reports on a Blockchain can relieve companies from compliance hardships.

#4 Data Storage & Management

The complex nature of the oil & gas industry makes it a daunting task for companies to collect effectively, record, and coordinate data on an oilfield or well and between all involved stakeholders. Blockchain technology facilitates data storage and maintenance by providing a single repository of all information, determined and managed by a consortium of stakeholders. The application of smart contracts automatically structures that data into a digestible format, eliminating manual re-organization.

#5 Supply Chain Transparency

Oil & gas operations are highly complex due to their vast supply chain spread across the globe, involving physical side suppliers, producers, and distributors. The logistics chain requires support streams for invoicing, documentation, and regulatory requirements. This enormous supply chain footprint can ultimately slow down the operations, such as transaction approval, as it involves multiple stakeholders operating in different time zones. These challenges have triggered companies to identify ways to optimize supply chain and transaction processing.

Blockchain and smart contracts, along with IoT devices, can change the traditional supply chain for oil & gas with the benefits of transparency and immutability. Transparency is achieved by the distributed storage and the embedded smart contracts, enabling Blockchain to govern the entire business process management (BPM). Blockchain takes the supply chain of oil & gas companies to the next level by providing a secured system for recording data and implementing and running smart contracts. With the power of smart contracts and IoT devices, the oil supply chain can have the ability of provenance and security.

For instance, Shell has initiated a pilot project to create a decentralized digital passport system to authenticate equipment, parts, and products. With the help of Blockchain technology, it creates a digital passport for each asset/equipment, thereby creating a system that enables data to be disclosed and exchanged between certain parties in a supply chain. In turn, this allows Shell to enhance tracking and management of safety-critical process equipment or products throughout their life cycles. Through deploying these technology tools, Shell is eyeing to reduce costs, increase productivity and help ensure safer operations for every party within the ecosystem.

#6 Smart Contracts

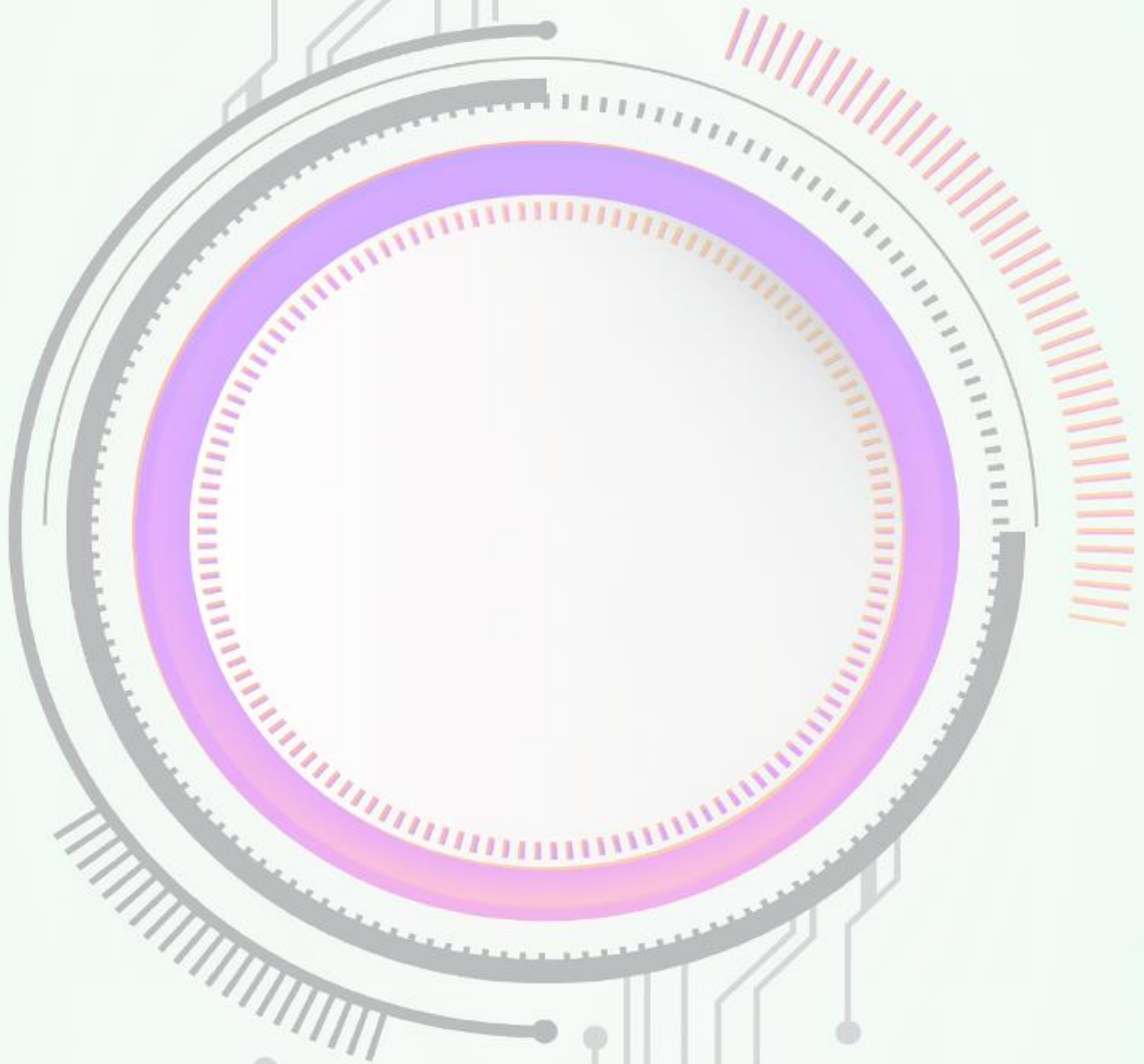
Oil & gas is a highly complex industry, sitting on the business of millions of barrels of oil and cubic meters of gas being bought and sold on international markets every day. Such humungous volume entails lengthy and complicated contracts between the trading parties. To manage such a complex network and facilitate the global distribution of oil & gas, the cross-border oil & gas transaction parties have actively started implementing Blockchain platforms and smart contracts. A smart contract can significantly decrease paperwork, streamline the process, enhance efficiency, and save costs.

Running in the Ethereum Virtual Machine, the smart contracts receive transaction requests and events from outside and generate new transactions and events by initiating the running code logic in advance. The results of the smart contract then continuously update the status of the ledger on the Ethereum network, and these modifications cannot be forged or manipulated once confirmed. Additionally, it doesn't require a third-party intervention, which makes it secure.

Blockchain can help improve oilfield asset visibility, which will decrease time spent resolving oilfield asset issues. Moreover, by seamlessly joining with other technologies, blockchain may help improve the identification of asset solutions. Blockchain will also help improve the oil and gas industry by cutting down on time and cost.

Conclusion

Blockchain has numerous value propositions to offer the oil and gas industry, but perhaps the most compelling one is developing a privately accessible blockchain network to support transaction life cycle across all of its stakeholders. Practical challenges may be there for the implementation of this broader ecosystem approach; therefore, the optimal value proposition will not be easily determined, and expert advice would be essential. A broad multi-disciplinary team of experts can help by providing expertise in the field and leadership in the areas that would most benefit from the blockchain system.





Mayur Bhujbal
MCA Student

To-do List Using Blockchain

It's a list of tasks you need to complete or things that you want to do. A to do list acts as an external memory aid. It's only possible to hold a few pieces of information at one time. Keep a to do list and you'll be able to keep track of everything, rather than just a few of the tasks you need to do. Your to do list will also reinforce the information, which makes it less likely you're going to forget something. To do lists come in all shapes and sizes. It always used to be something that you would write using pen and paper, but thanks to technology there's an app and website that can come to the rescue. We are going to build a to-do list application that will save the data in the blockchain. The blockchain part of this application can also be understood as a database. First, we'll create a smart contract and in the subsequent the web application itself. We'll use Bloc as the application name but first, let's look at the components.

Having a list of everything you need to do write down in one place means you shouldn't forget anything important. By prioritising the tasks in the list, you plan the order in which you're going to do them and can quickly see what needs your immediate attention and what tasks you can leave until a little later.

Most typically, they're organised in order of priority. Traditionally, they're written on a piece of paper or post it notes and act as a memory aid. As technology has evolved, we have been able to create a to-do lists with excel spreadsheets, word documents, [email](#) lists, to-do list apps, Microsoft to do and google to do list to name a few. You can [use a to do list](#) in your home and personal life, or in the workplace.

Blockchain and Smart Contracts

A blockchain is a peer-to-peer network of computers, or nodes, that talk to one another. It's a distributed network where all of the participants share the responsibility of running the network. Each network participant maintains a copy of the code and the data on the blockchain. All of the code on the blockchain is contained in smart contracts, which are programs that run on the blockchain. They are the building blocks of blockchain applications. It will be responsible for fetching all of the tasks in our to-do list from the blockchain, adding new tasks, and completing tasks. Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be tangible (a house, car, cash, land) or intangible (intellectual property, patents, copyrights, branding). Virtually anything of value can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved.

Why blockchain is important?

Business runs on information. The faster it's received and the more accurate it is, the better. Blockchain is ideal for delivering that information because it provides immediate, shared and completely transparent information stored on an immutable ledger that can be accessed only by permissioned network members. A blockchain network can track orders, payments, accounts, production and much more. And because members share a single view of the truth, you can see all details of a transaction end to end, giving you greater confidence, as well as new efficiencies and opportunities.

Architecture of Blockchain

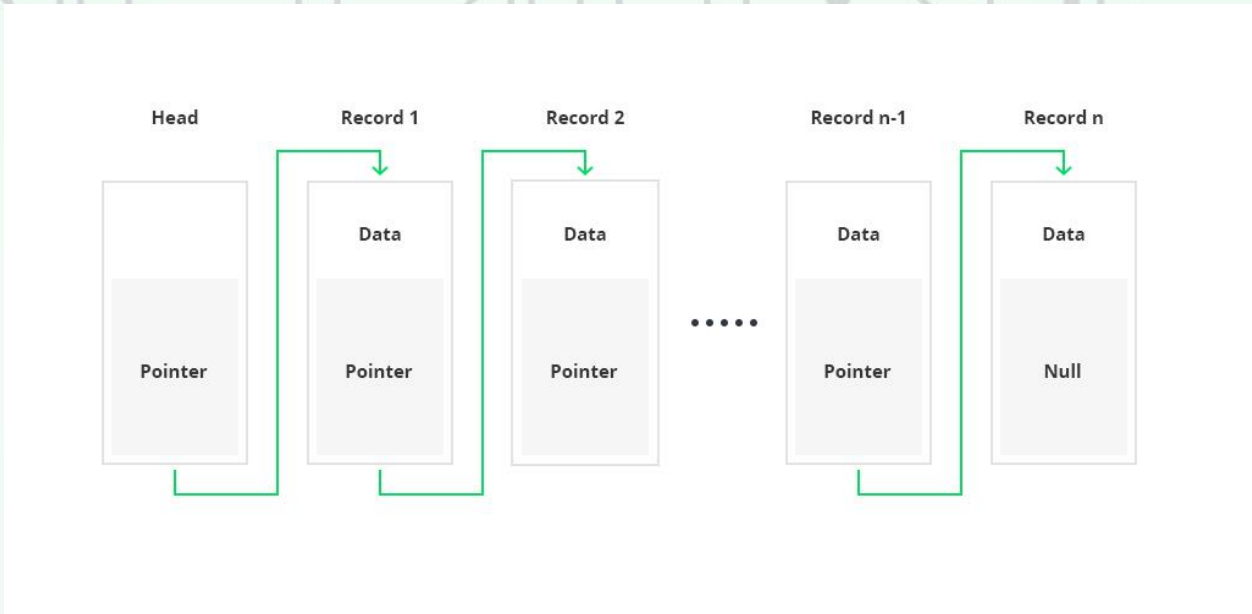
The traditional architecture of the World Wide Web uses a client-server network. In this case, the server keeps all the required information in one place so that it is easy to update, due to the server being a centralized database controlled by a number of administrators with permissions.

In the case of the distributed network of blockchain architecture, each participant within the network maintains, approves, and updates new entries. The system is controlled not only by separate individuals, but by everyone within the blockchain network. Each member ensures that all records and procedures are in order, which results in data validity and security. Thus, parties that do not necessarily trust each other are able to reach a common consensus.

To summarize things, the blockchain is a decentralized, distributed ledger (public or private) of different kinds of transactions arranged into a P2P network. This network consists of many computers, but in a way that the data cannot be altered without the consensus of the whole network (each separate computer).

The structure of blockchain technology is represented by a list of blocks with transactions in a particular order. These lists can be stored as a flat file (txt. format) or in the form of a simple database. Two vital data structures used in blockchain include:

- Pointers - variables that keep information about the location of another variable. Specifically, this is pointing to the position of another variable.
- Linked lists - a sequence of blocks where each block has specific data and links to the following block with the help of a pointer.



Logically, the first block does not contain the pointer since this one is the first in a chain. At the same time, there is potentially going to be a final block within the blockchain database that has a pointer with no value.

Basically, the following blockchain sequence diagram is a connected list of records:

