



Ethereum Merger

For Prelims: Ethereum Merge, Ethereum blockchain platform, 'proof-of-stake, decentralised apps (dApps), Non-fungible tokens (NFTs), Decentralised finance (DeFi), Cryptocurrency, Blockchain, Proof of Work(PoW).

For Mains: Cryptocurrency & Related Issues.

Why in News?

Recently, the [Ethereum](#) blockchain platform fully **transitioned from 'proof of work' to a 'proof-of-stake' consensus mechanism** and this revamp is known as the **Merge**.

What has Exactly Changed?

▪ Old Method:

- **Proof of Work:** As a decentralised platform, Ethereum doesn't have institutions like banks approving the transactions that happen on its network - the **approvals were earlier happening under the Proof of Work(PoW) consensus mechanism** which was essentially **done by miners**.
 - Under it, the **miners would compete to solve complex mathematical puzzles** using a massive infrastructure of cutting-edge computer hardware, and the first one to solve the puzzle would be chosen as the validator.
 - This method was almost **entirely dependent on crypto farms**, which are massive warehouses lined with rows of computers which would solve the puzzles.

▪ Issues:

- **High Energy Consumption:** These mining farms were **energy guzzlers** and they sometimes **consumed more electricity than entire countries** and were, therefore, a big concern in terms of [environmental sustainability](#).
- The crypto's total annualised power consumption nearly **matches that of Finland**, while its carbon footprint is comparable to Switzerland.
 - For some time, European countries even mulled a crypto mining ban, while China actually carried out a nationwide crackdown on crypto miners, sending them fleeing overseas.

▪ New Method:

- **Proof of Stake:** It would **set aside the need for crypto miners and gigantic mining farms**, which had previously driven the blockchain under a mechanism called '**proof-of-work' (PoW)**.
 - Instead, it has now **shifted to a 'proof-of-stake' (PoS) mechanism** that **assigns 'validators' randomly to approve transactions and earn a small reward**.
 - Validators are people who **volunteer a computer to maintain the blockchain's integrity** by constantly computing the linkage from the first block to the last.

▪ Benefits:

- This would entirely **eliminate the need for miners** on the Ethereum network.
- It will **reduce ethereum's energy consumption** by nearly 99.95%.
- It will make **transactions on the Ethereum network extremely secure**.

What do we Know about Ethereum?

- Ethereum is one of the **most used platforms by developers to build decentralised apps (dApps)**, smart contracts, and even crypto tokens. The platform's currency, Ether is only second to Bitcoin in terms of market capitalisation.
- Some of the most popular applications of cryptocurrencies such as **non-fungible tokens (NFTs)** and **decentralised finance (DeFi)** are based on the Ethereum network.

What is Cryptocurrency?

- **Cryptocurrency**, sometimes called crypto-currency or crypto, is any form of currency that exists digitally or virtually and uses cryptography to secure transactions.
- Cryptocurrencies don't have a central issuing or regulating authority, instead using a decentralized system to record transactions and issue new units.
 - It is supported by a decentralized **peer-to-peer network** called the **blockchain**.

What is Blockchain Technology?

- **Blockchain technology** ensures that **all transactions in cryptocurrencies are recorded** in a public financial transaction database.
 - Bitcoin, Ethereum, and Ripple are a few notable **examples** of cryptocurrencies.
- Blockchain derives its name from the **digital databases or ledgers** where information is stored as **"blocks"** that are coupled together to form **"chains"**.
 - It offers a **singular combination of permanent and tamper-evident record-keeping**, real-time transaction transparency, and auditability.
 - An exact copy of the blockchain is **available to each of the multiple computers** or users who are joined together in a network.
 - Any new information added or altered via a new block is to be vetted and **approved by over half the total users**.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. With reference to "Blockchain Technology", consider the following statements: (2020)

1. It is a public ledger that everyone can inspect, but which no single user controls.
2. The structure and design of blockchain is such that all the data in it are about cryptocurrency only.
3. Applications that depend on basic features of blockchain can be developed without anybody's permission.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 only
- (d) 1 and 3 only

Ans: (d)

Exp:

- **A blockchain is a form of public ledger, which is a series (or chain) of blocks on which transaction details are recorded and stored** on a public database after suitable authentication and verification by the designated network participants. A public ledger can be viewed but cannot be controlled by any single user. Hence, statement 1 is correct.
- The blockchain is not only about the cryptocurrency but it turns out that blockchain is actually a pretty reliable way of storing data about other types of transactions, as well.
- In fact, blockchain technology can be used in property exchanges, bank transactions, healthcare, smart contracts, supply chain, and even in voting for a candidate. Hence, statement 2 is not correct.
- Although cryptocurrency is regulated and needs approval of the central authorities, blockchain technology is not only about cryptocurrency. It can have various uses, and applications based on basic features of the technology can be developed without anybody's approval. **Hence, statement 3 is correct. Therefore, option (d) is the correct answer.**

Mains

Q. What is Cryptocurrency? How does it affect global society? Has it been affecting Indian society also? **(2021)**

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