Origin of the Blockchain

Electronic Systems and Trust

- Before Blockchain, the idea of cryptocurrency and the systems reliable to operate that currency was just a dream. The internet was required to be distributed, reliable and it was needed to be used by almost all of the population as it digitally connects the world together.

- The development of TCP IP networking architecture made a huge impact on the usage of the internet. It established the standard for communication such as HTTP which is used to provide web browsing and SMTP, an electronic mail delivery service.

- The systems always required two different types of trust. They are:

    - **Intermediary trust**: An intermediary trust means a person who is relied on to make relational and fair decisions.
    - **Insurance trust**: A third party who is responsible for making decisions that is related to the safety and soundness of a value.

- When value takes a digital form that is when it is moved from physical items like coins, notes, metals like gold, silver, platinum etc., to digital, there is a need for the trust among the people involved in the transactions.

Electronic Systems and Trust

- Trust is never stable in the financial world.
- This is one of the main reasons in the pile of events that led to the creation of the mighty digital currency BITCOIN.
- The Blockchain technology is an effort that was made to re-establish the long lost trust in digital transactions. It is made up of technology to build trust, specifically cryptography which is used to deal with critical data, to automate and enforce the trust into the system.
- Bitcoin was the first working cryptocurrency system that was built using the Blockchain technology.

Distributed, Centralized and Decentralized Architecture

Any piece of software that is connected to another system, must follow a systematically designed architecture for connection management, scalability and efficient use.

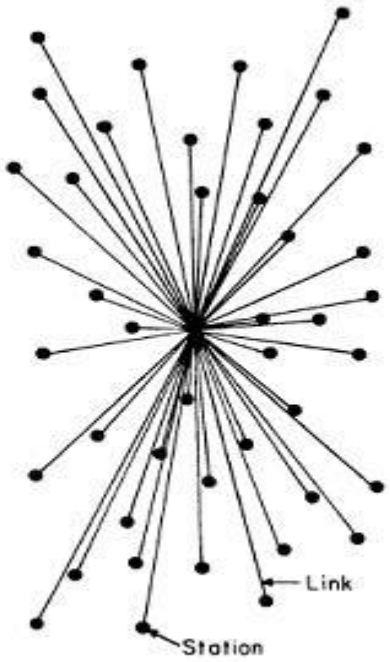
There are three different types of architectures available that are used according to the business needs, user flow and nature of the network that the system is using.

The widely used and most popular network architectures are:

1. Centralized architecture
2. Decentralized architecture
3. Distributed architecture

Centralized Architecture

In the centralized architecture, there are two types of nodes that participate in the system. The first one is the server or super node and the second one is the client or user node. The super node is the heart of the network which stores the data and provides services to the clients connected to it.



The **advantages** of this approach are:

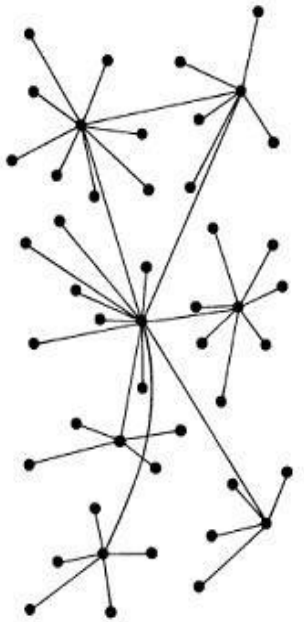
- It is simple for deployment.
- The development time for this approach is relatively short.
- It is cheaper, which means the development, deployment and maintenance costs are less.
- It is practical when there is a need to control the data at one location.

The **disadvantages** are:

- There is always a chance that the system is prone to failure.
- Higher security and privacy risks for users.
- It requires longer time for accessing the data for users who are physically far from the server.

Decentralized Architecture

As the name suggests, the system is not centric, it is distributed to multiple super nodes or servers. Every super node in the network is connected with at least one another super node. Each super node contains the same copy of data available and must provide the same services as other nodes.



The **advantages** of using decentralized system are:

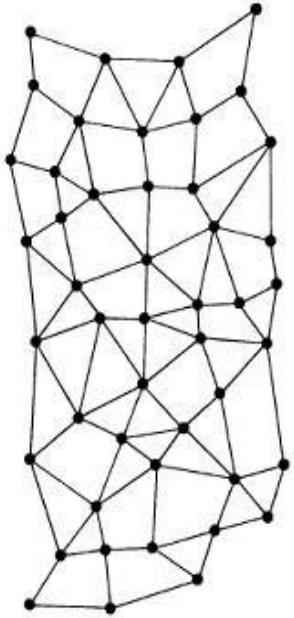
- The system is less likely to be unavailable for users than a centralized system.
- It assures better performance in availability and response time.
- It provides space for diverse and flexible systems.

The **disadvantages** are:

- There are some security and privacy concerns to be taken care of as the data is available at multiple locations.
- The maintenance costs are higher because we are maintaining multiple servers which are high performing computers with advanced hardware.
- The system needs to be properly optimized, else it leads to inconsistent performance.

Distributed Architecture

A distributed system is the same as a decentralized system with no central owners. In distributed systems, users have the same level of data access, though user privileges can be restricted if needed.



The **pros** of distributed systems are:

- The system is highly fault-tolerant.
- The network is transparent and more secure.
- It promotes resource sharing that can reduce burden on single or selected machines.
- The network can be extremely scalable.

The **cons** of using distributed systems are:

- It is more difficult to deploy a network.
- The maintenance costs are higher than any other method.