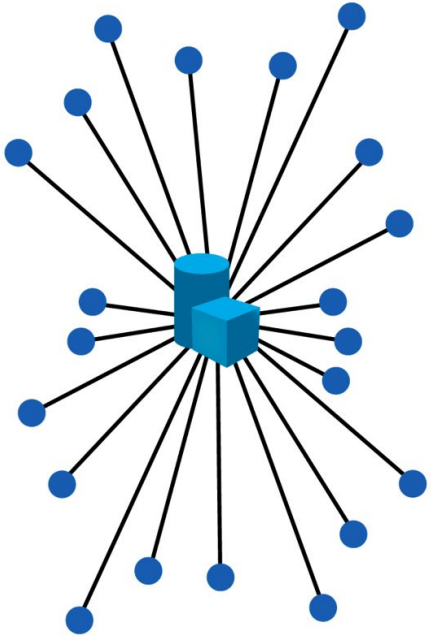
Why is Blockchain a Distributed, P2P Network?

Types of Network



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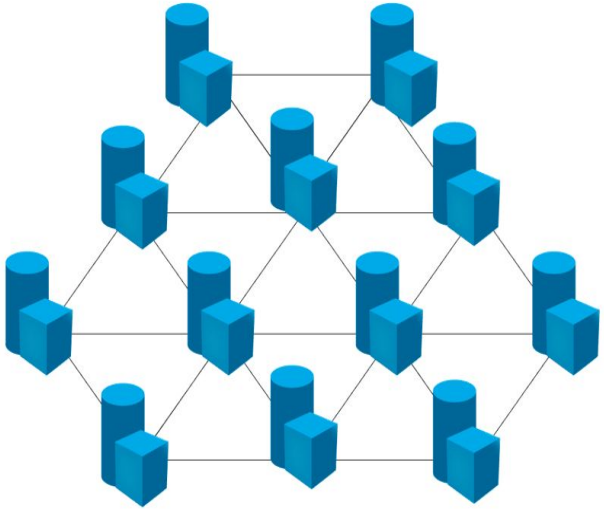

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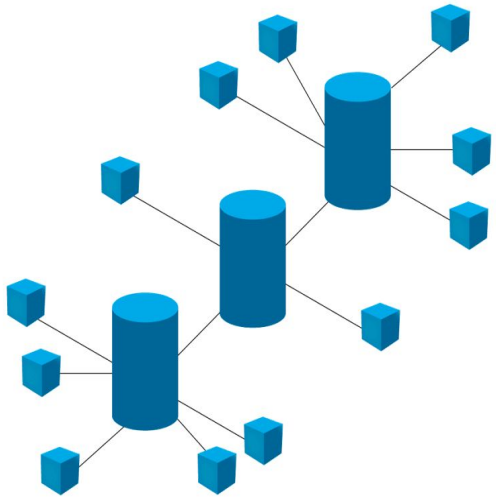

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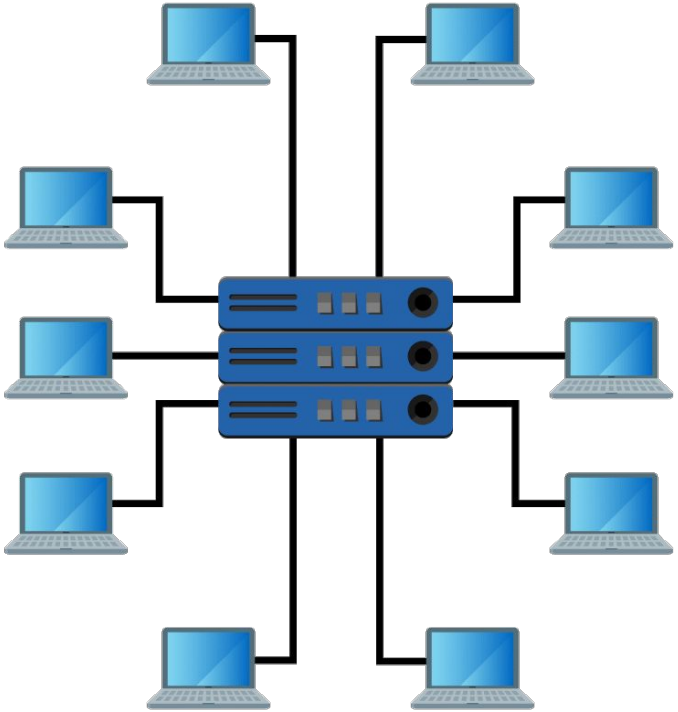
Peer-to-Peer (P2P) Network

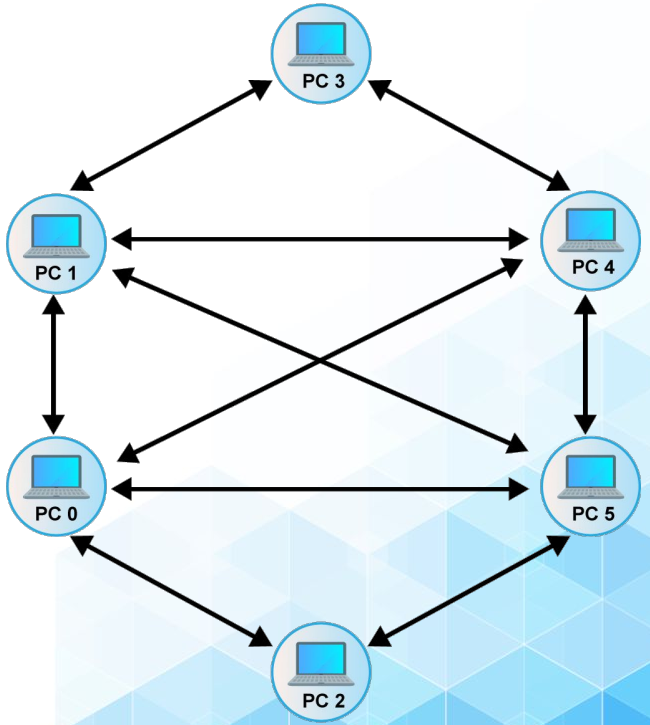
- In a P2P network, there is no central governing authority.
- A node can act as a server from which other nodes can download files.
- A node can also act as a client and can download files from other nodes.
- Early version of P2P architecture was with file-sharing programs. Currently, P2P powers the cryptocurrencies networks, and is also adopted in distributed computing applications like search engines, online streaming platforms, marketplaces, and interplanetary file systems, also known as IPFS.

Peer-to-Peer systems are classified as:

- **Unstructured** - No specific organization of the nodes. Participants communicate randomly with one another.
- **Structured** - Built as per a more organized design, provides a precision search using hash functions for faster database lookups. These networks are more centralized and less robust.
- **Hybrid** - Combines the conventional client-server model with peer-to-peer architecture. Using central server to manage connections between peers. Hybrid models provide an improved overall performance.

Server-based Vs Peer-to-Peer Network





Distributed P2P Network - Blockchain

- Satoshi Nakamoto used Blockchain in Bitcoin to maintain a distributed ledger of transactions on bitcoin network which is distributed to the whole network.
- Blockchain is a digital ledger that maintains records of all fund transactions. Nodes in this network store a copy of the blockchain and keep on updating it with new blocks. They participate in verifying the actual state of blockchain.
- P2P network requires consensus from the majority network participants to ensure data validity and security.
- The P2P architecture of blockchain provides benefits of greater security than traditional client-server based networks, as distributed structure provides fault tolerance and no single point of failure.

- A Peer-to-peer network has certain limitations:
  - Large computational power required to maintain the network.
  - Low network throughput.
  - 51% attack that limits the efficiency and scalability.

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THANK YOU!

Any Questions?

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