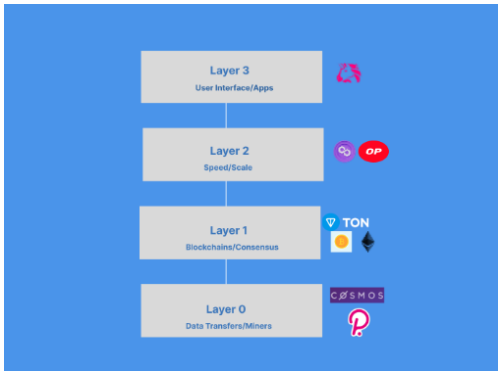
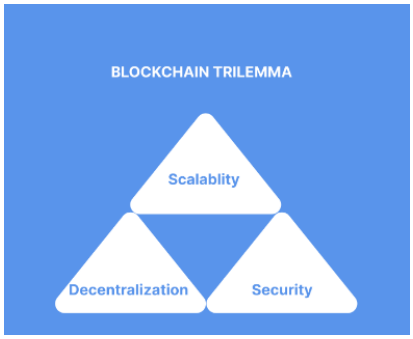
Unraveling the Layer 1 Blockchain

Layers in Blockchain: The Tiers of Decentralization

Blockchain's decentralized ledger system operates according to a predetermined protocol and requires the agreement of many computers (or nodes) in the network to handle the exchange of information. New entries are constantly being added, reviewed and updated on each page. There are four floors in total and each has its own role.



Everything works on a chain. Here, transactions are documented securely using an asymmetric key pair, while a token validation algorithm verifies and processes each transaction, exchange rate or fuel price. Choose the right approval mechanism. This is a minor issue with **secure**, **scalable** and **decentralized**.Tradeoff between these 3 factors is known as blockchain trilemma.



Components of Layer 1(L1)

Building Blocks: These blocks are created and integrated by miners who had to work on complex mathematical calculations then checked by validators. A single block is a collection of files that contain information about preceding blocks in the chain, as well as details about new transactions. Each block is inextricably linked to its predecessor, creating an unchangeable, tamper-proof chain of records. The time needed for execution will be based on the model of the blockchain. This is handled by blockchain.

Transactions: A pivotal feature that underpins the very essence of blockchain technology is its unwavering devotion to durability and irreversibility. Once a transaction is permanently etched into the blockchain's distributed ledger, it becomes an indelible part of the chain, immune to tampering or reversal. This immutable nature serves as the bedrock of trust and accountability, making sure that recorded information remains unaltered as well as checked by all participants.
The Consensus Mechanism: Blockchain networks depend on something called consensus algorithms, whose job is to ensure that transactions added to the blockchain block are legitimate, the network remains secure. Some **consensus** algorithms prioritize speed, build the easier swift transaction processing, while others emphasize heightened confidentiality and decentralization,potentially sacrificing immediacy.L1 blockchain consensus mechanisms include:

- **Proof of Work (PoW):** With this method, network participants resolve tough mathematical problems, which requires substantial compute power. Network participants are called **Miners**. The participant who solves the problem first gets to add the next block to the blockchain and gets **rewarded** with a predetermined amount of **crypto**. This algorithm **requires** a **large** amount of **computation** power and energy consumption, which eventually makes it **relatively slow** and expensive to perform.
- **Proof of Stake(PoS):** This consensus mechanism aims to secure the network by having participants stake their own cryptocurrency. Based on this stake, the network randomly selects a participant to validate the next block of transactions. The selected participant is then rewarded with a transaction fee for their work. This is what makes Proof of Stake (PoS) a faster and more energy-efficient consensus protocol compared to Proof of Work.

TON: Harnessing layer 1 blockchain technology

Telegram Open Network (TON) uses a layer 1 solution that provides distributed support for large-scale cryptocurrencies. It has great potential and various applications (dApps). Here's a closer look at how TON integrates Layer 1 solutions to enhance its blockchain infrastructure: **Integrated PoS Consensus mechanism:** TON adopts **Proof of Stake (PoS)** Network to help secure its power. It has a stable and decentralized framework while minimizing consumption. This is important for TON as it aims to process millions of transactions rapidly and cost-effectively. **Fragmented** architecture. This approach enhances network availability because many parts are connected together. And it is solid; It gives a safe and flexible environment for developers who are building dApps.

TON's Sharding Approach: To address the scalability challenges inherent in traditional blockchain architectures, TON (Telegram Open Network) embraces a pioneering technique called sharding. This innovative approach strategically fragments the network into smaller, self-contained partitions known as shards, each capable of operating autonomously. Rather than relying on a **monolithic** structure, sharding enables parallel processing of transactions across multiple shards simultaneously. By distributing the computational workload, TON effectively circumvents the bottlenecks that often hinder scalability in conventional blockchain systems. This decentralized fragmentation strategy exponentially amplifies the network's throughput capabilities, as an increasing number of shards can concurrently validate and record transactions.

Security: The main purpose of TON is to protect the network against attacks. The combination of encryption algorithms and decentralized consensus mechanisms can improve TON's ability to prevent security threats and preserve the integrity and trustworthiness of the platform.

How Layer 1 differs from L0, L2,L3

Layer 0 (L0)	Layer 1 (L1)	Layer 2 (L2)	Layer 3 (L3)
Gives Infrastructure for exchange of data	Consist decentralized ledger to manage records of transactions	Responsible for making connection between different components of blockchain	Provides interface to interact users with blockchain and it’s services

Defines P2P (Peer-to-Peer) Network Infrastructure, interoperability protocols	Uses Consensus Mechanism for adding new blocks to Blockchain	Provides scalability using channels,roll-ups, plasma and sidechain	Complex smart contract can be built with user friendly applications
Known as Infrastructure Layer	Known as Base Layer	Known as Middleware Layer	Known as Application Layer
Fast transaction processing, enhanced security network infrastructure	It is secure, decentralized, but its scalability is limited and its transaction fees are high	Highly scalable, fast transactions with low fees but security affected	Provides real-world applications with better user-experience(UX)

Links

TON wiki

TON PoS Implementation