Scaling can be achieved in different ways. One of the ways is “sidechains” – which happens in two ways: pegging to bitcoin according UTXO amount or burning bitcoin. The process looks like a casino where one puts dollars to the casino and plays with chips after game ends, they exchange chips to dollars again. Another direct example would be crypto exchanges which hold huge amount of bitcoin and allow millions of transactions to happen in their system. This can be possible only with forking bitcoin and adding more features in the following ways: the SPV trick – using the same logic of bitcoin to validate transactions in sidechain, contesting a transfer – similar to SPV but accepts proofs from sidechain in case of users get harmed who are not in the longest chain, compact SPV proofs via proof-of-work samples – checking PoW of blocks with only different hash rates.

In the case of Ethereum “layer 2” serves as a new blockchain network and built on top of it. It does not require any change in Ethereum “layer 1” protocol but can increase transaction speed and reduce gas prices paid by users. There are different strategies for this: rollups which batches transactions in one and submits to main chain using optimistic – only computation or zero-knowledge – submits validity of transactions also, state cannels used for frequent payment platforms which happen off chain and only two transactions submitted to the main chain, plasma is mainly copy of “layer 1” connected as a child blockchain to “layer 1”, validium similar to zk-rollups but does not store data in the main chain.

Another way of scaling blockchain is sharding – linear scaling and replicating the current system. On example of sharding can be “Asynchronous Consensus Zones” which divides blockchain in parallel instances and handles mining competition, chain growth and validation asynchronously in instances. There two key features introduced in this paper: cross-zone atomicity – connected transactions happening in different zones reach to one state eventually, effective mining power amplification – uses Chu-ko-nu protocol to allow honest nodes to create blocks in different zones which serves as protection again 51% mining power attacks. Communication between zones and nodes insides each zones is handled using “swarms” – gossiping groups which keeps data consistent among all zones. Blocks divided into two parts: PoW and transactions blocks.