

ETH 2.0

ETH 2.0 is considered crucial for the future of the second largest blockchain. There is hardly a blockchain where so much happens as on Ethereum. The home of most smart contracts, the blockchain that has the greatest appeal to developers and companies. However, Ethereum does not yet officially have its true, intended shape. This is to be achieved by taking the step to “Serenity” (engl.: wisdom). The transition to Serenity was planned by a simple hard fork. Since it is more complicated than initially expected, this transformation will now take place in a lengthy process that could take 4-5 years.

Ethereum, as it is today, is slow. The blockchain only manages 15 transactions per second, and any complex application that scales up will be extremely expensive. Ethereum is slow because it is decentralized and must remain decentralized. Simple solutions would compromise decentralization and its censorship resistance quality. The good old blockchain trilemma of decentralization, scalability, and security. ETH 2.0 is not just an upgrade, it reinvents blockchain. It is designed to make Ethereum more secure, scalable, improve programmability — all without compromising decentralization.

ETH 2.0 will solve the classic blockchain trilemma by three main achievements: sharding, proof of stake and a new virtual machine. Sharding is a method of splitting databases across multiple servers, in other words, partitioning them. The security of a “splitter” (“shard”) should be as high as that of the entire system. Proof of Stake means that there are no more miners that form blocks by using energy, they are replaced by Stakers, nodes that prove that they have a certain amount of ETH. With Proof of Stake, Ethereum transactions should be finalized in seconds, while the blockchain is resistant to 51% attacks. Finally, the new virtual machine should allow developers to create their own execution environment. This allows the rules of other blockchains, for example BTC, to be introduced on a shard. Ethereum should thus become a universal construct of different blockchains.

Phase 0 (expected 2 half 2020) will be the Beacon Chain. This new blockchain to be created can initially coordinate up to 64 shard chains. It will be ‘a kind of command and control center’ for the entire ETH2 network. The Beacon Chain manages the “Caspar Proof of Stake” protocol. It notes validators and their stakes, randomly selects block validators and assigns them a random shard chain. The Beacon Chain applies the consensus rules, executes sanctions for dishonest validators and serves as a link between the shards. As a reward for their work, the validators receive ETH 2.0. This is the native coin on the beacon chain. In the long run, it will replace ETH and will be distributed without a fixed limit to guarantee the security of the blockchain in the long run. If phase 0 is successful, there will be two Ethereum blockchains: eth1 and eth2.

Phase 1, presumably from 2021, the first Shard Chains will go live. These shards will initially store the data in raw form where they are not able to process data according to certain consensus rules or even display account balances of users or addresses. They are only used as a laboratory to test the shard architecture. The focus of Phase 1 is on the work of the beacon chain: It now starts to reference the states of the shards by cross-links and thus finalize them. In this phase, the eth1 and eth2 blockchains will continue to work in parallel.

Phase 2 (2021/2022) according to the roadmap, will “fulfill the true vision of ETH 2.0”, the shards will be able to process transactions. From this phase on, the ETH 2.0 network should also be usable for real applications. In the further course of the project, smart contracts will also be activated on the shards. Then it will allow activating own rules on the shards, which for example emulate other blockchains like Bitcoin or others. Phase 2 “combines the functionality

of all chains.” The shard chains, formerly pure data stores, are now becoming structured chains that link the states of smart contracts with a consensus process. Developers can form their DApp on a shard, Ethereum becomes a multi-chain system governed by the Beacon chain.

The remaining phases 3-6 are so far out that we won't explain in detail now. Phase 3 The Light Client State Protocol, Phase 4 Cross-Shared Transaction, Phase 5 Tight coupling with main chain security, Phase 6 Super-quadratic or exponential sharding.