

Blockchain Fundamentals: Course Preview

INTRO Preview – What You Will Learn

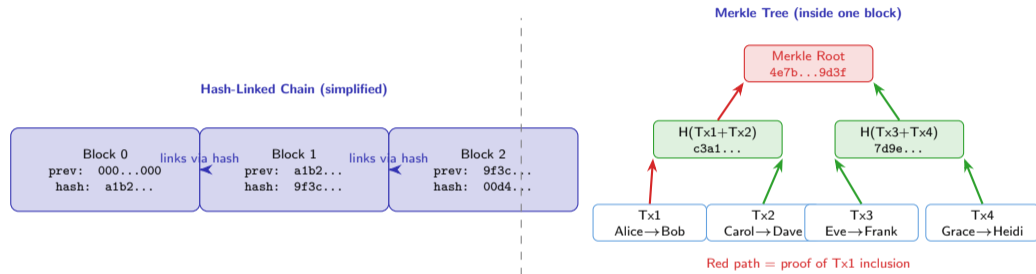
Prof. Dr. Joerg Osterrieder

University Lecture Series

February 25, 2026

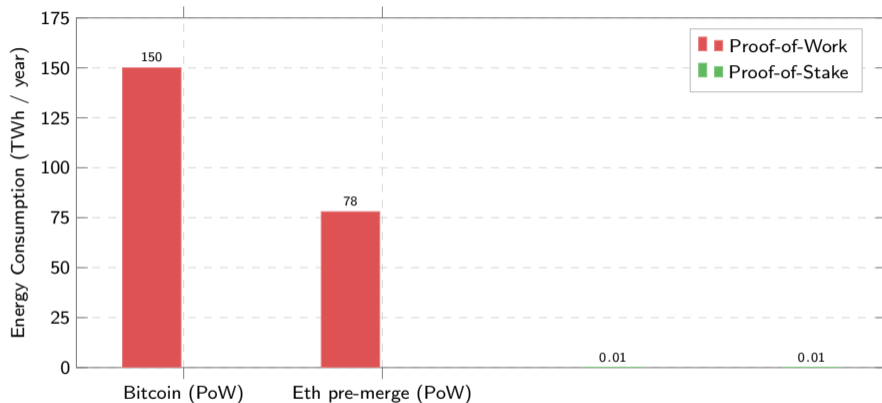
Each block bundles a set of transactions under a tamper-evident header linked to its predecessor.

Hash Linking and Merkle Trees



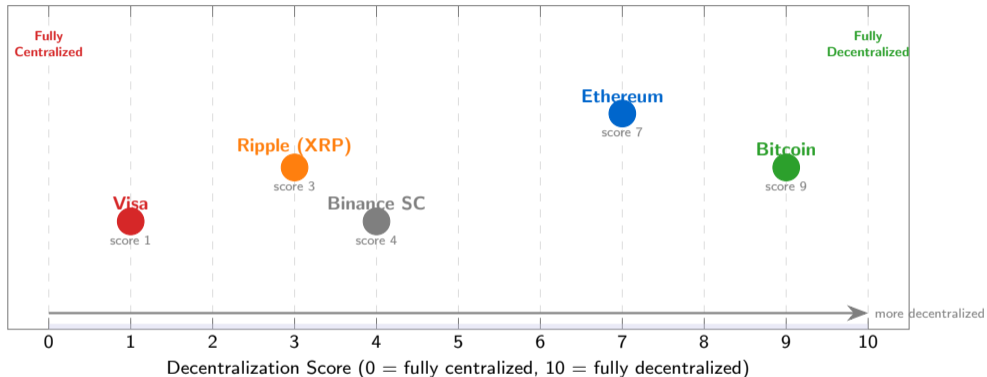
Hash chaining ensures tamper-evidence; Merkle trees enable lightweight transaction proof without downloading the full block.

Proof-of-Work vs. Proof-of-Stake: Energy Footprint



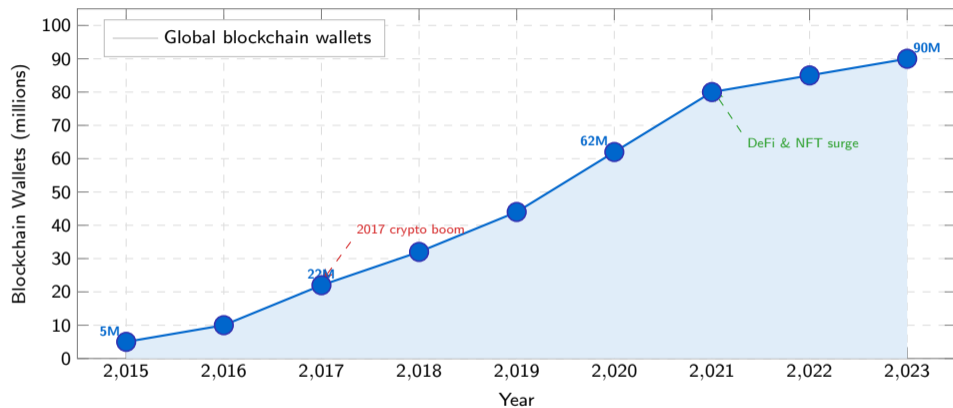
Switching consensus from PoW to PoS reduced Ethereum's energy use by $\approx 99.95\%$ – a key sustainability milestone for the industry.

Decentralization Spectrum of Major Blockchain Projects



Decentralization is a spectrum, not a binary property – projects trade control for scalability, speed, and governance flexibility.

Blockchain Adoption Trends: Wallet Growth



Global blockchain wallet count grew $\approx 18\times$ between 2015 and 2023, reflecting accelerating mainstream and institutional adoption.