The Panorama of PECTRA Upgrade

Ethereum's next big upgrade, "PECTRA" is finally out! It is scheduled to be live on the Holesky testnet and Sepolia testnet in the month of February and March 2025, respectively. It is the shortened form of Prague, the execution layer hard fork, and Electra, the consensus layer hard fork, and hence, poised to bring changes to both the execution and consensus layer of Ethereum.

Who are the intended beneficiaries of this upgrade?

Everyone from Ethereum users to developers and validators benefits from this upgrade

What are the improvements expected?

Pectra is set to offer the following functionalities:

Redefine EOAs: The upgrade intends to enable the EOAs with hybrid smart contract features that include batched transactions, sponsoring gas, alternate authentication mechanisms, improving security through administering spending controls, and extended recovery mechanisms for safeguarding assets.

Enhance the staking experience: It allows validators to compound their rewards by staking higher ETH within a single validator client itself.

Easing withdrawal process: The withdrawal process for staked ETH is simplified, thus empowering validators

Reinforces Ethereum's data throughput: Pectra leverages the scalability and affordability aspect of rollups to increase the blob size, rendering more space for data

What are the EIPs to watch out for in Pectra?

As per Ethereum Foundation's reports, Pectra is estimated to have the biggest set of EIPs. Amongst them, the EIPs below are the major definers:

1. EIP 7702 - Endows the Externally Owned Accounts (EOAs) with smart contract functionality.
2. EIP 7251, 7002, and 6110 - Aim to scale the validator's experience. The EIP-7251 allows a single validator client to raise their staked ETH (maximum effective balance) from 32 ETH to 2048 ETH. This allows stakers serving as multiple validators to aggregate as a single one without compromising on the rewards and the network overhead. EIP-7002 introduces a flexible withdrawal process for stakers. It exempts the need for a validator signing key to trigger an exit. An Ethereum address with a valid withdrawal credential proceeds for an exit seamlessly. EIP-6110 reduces the delays encountered for processing validator's deposits from 9 hours to 13 minutes.
3. EIP-7691- Boosts the blob capacity by 50%. As Layer 2 is constantly thriving, the upgrade aspires to increase blob usage by increasing the current network target of 3 to 6 blobs per block(and a maximum of 9 blobs in the event of high demand). At the same time, the call data storage cost is also spiked (EIP-7623), to incentivise blob usage effectively.

The specifications of the Pectra upgrade are detailed in EIP-7600.