

# State of the Ethereum Union ( $1/N$ perspective)



mike neuder

ETH Boston; Saturday, April 27, 2024

# Outline

- Preliminaries
  - ◊ Raison d'être
  - ◊ Caveat emptor



# Outline

- Preliminaries
  - ◊ Raison d'être
  - ◊ Caveat emptor
- (recent) Past
  - ◊ A hard-fork-centric retrospective
  - ◊ The rollup-centric roadmap



# Outline

- Preliminaries
  - ◊ Raison d'être
  - ◊ Caveat emptor
- (recent) Past
  - ◊ A hard-fork-centric retrospective
  - ◊ The rollup-centric roadmap
- (soon<sup>TM</sup>) Present
  - ◊ (don't) Reject Modernity
  - ◊ Ethereum goals and non-goals



# Outline

- Preliminaries
  - ◊ Raison d'être
  - ◊ Caveat emptor
- (recent) Past
  - ◊ A hard-fork-centric retrospective
  - ◊ The rollup-centric roadmap
- (soon™) Present
  - ◊ (don't) Reject Modernity
  - ◊ Ethereum goals and non-goals
- (short/medium-term) Future
  - ◊ Disclaimer (opinion forthcoming)
  - ◊ To Prague/Electra
  - ◊ & Beyond



# Preliminaries

## Raison d'être

[Δ Draft](#) [Meta](#)

### EIP-7600: Hardfork Meta - Pectra



EIPs included in the Prague/Electra Ethereum network upgrade.

Authors Tim Beiko (@timbeiko)

Created 2024-01-18

Discussion Link <https://ethereum-magicians.org/t/eip-7600-hardfork-meta-prague-electra/18205>

Requires EIP-2537, EIP-2935, EIP-3074, EIP-6110, EIP-7002, EIP-7251, EIP-7548, EIP-7569

---

<https://eips.ethereum.org/EIPS/eip-7600>

<https://twitter.com/VitalikButerin/status/1741190491578810445>

# Preliminaries

## Raison d'être

[Δ Draft](#) [Meta](#)

### EIP-7600: Hardfork Meta - Pectra



EIPs included in the Prague/Electra Ethereum network upgrade.

Authors Tim Beiko (@timbeiko)

Created 2024-01-18

Discussion Link <https://ethereum-magicians.org/t/eip-7600-hardfork-meta-prague-electra/18205>

Requires EIP-2537, EIP-2935, EIP-3074, EIP-6110, EIP-7002, EIP-7251, EIP-7548, EIP-7569

- Plenty of 'next-hard-fork' discussions.

---

<https://eips.ethereum.org/EIPS/eip-7600>

<https://twitter.com/VitalikButerin/status/1741190491578810445>

# Preliminaries

## Raison d'être

[Draft](#) [Meta](#)

**EIP-7600: Hardfork Meta - Pectra** [🔗](#)

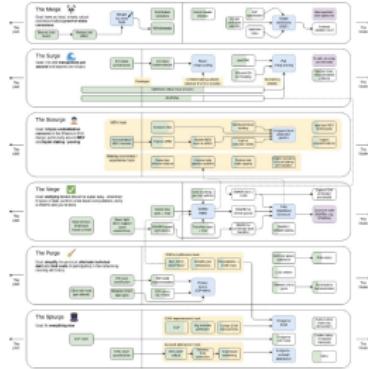
EIPs included in the Prague/Electra Ethereum network upgrade.

**Authors** Tim Beiko (@tmbbeiko)

**Created** 2024-01-18

**Discussion Link** <https://ethereum-magicians.org/t/eip-7600-hardfork-meta-prague-electra/18205>

**Requires** EIP-2537, EIP-2935, EIP-3074, EIP-6110, EIP-7002, EIP-7251, EIP-7549, EIP-7569



The diagram illustrates the evolution of the Ethereum network through a series of hard forks. It shows the sequence of upgrades from The Merge to The Spurgle, with The Prague/Electra upgrade highlighted as the fifth major fork. The upgrades are represented by boxes with arrows indicating their chronological flow and dependencies. The boxes are color-coded to represent different eras or specific upgrade phases.

- Plenty of 'next-hard-fork' discussions.
- 'Endgame' research relatively well understood.

<https://eips.ethereum.org/EIPS/eip-7600>

<https://twitter.com/VitalikButerin/status/1741190491578810445>

# Preliminaries

## Raison d'être

**EIP-7600: Hardfork Meta - Pectra**

EIPs included in the Prague/Electra Ethereum network upgrade.

Authors Tim Beiko (@timbeiko)

Created 2024-01-18

Discussion Link <https://ethereum-magicians.org/t/eip-7600-hardfork-meta-prague-electra/18205>

Requires EIP-2537, EIP-2935, EIP-3074, EIP-6110, EIP-7002, EIP-7281, EIP-7548, EIP-7669

➡ ? ➡

The diagram illustrates the sequence of Ethereum network upgrades from The Merge to The Split. It shows the flow of upgrades: The Merge (EIP-1559), The Surge (EIP-3549), The Sponge (EIP-4844), The Merge (EIP-4844), The Parallel Upgrade (EIP-4844), and finally The Split (EIP-4844). Each stage includes various EIPs and their dependencies, such as EIP-2537, EIP-2935, EIP-3074, EIP-6110, EIP-7002, EIP-7281, EIP-7548, and EIP-7669. The diagram uses color-coded boxes to represent different components or phases of the upgrade process.

- Plenty of 'next-hard-fork' discussions.
- 'Endgame' research relatively well understood.
- The middle-ground can be rather murky.

<https://eips.ethereum.org/EIPS/eip-7600>

<https://twitter.com/VitalikButerin/status/1741190491578810445>

# Preliminaries

## Raison d'être

**EIP-7600: Hardfork Meta - Pectra**

EIPs included in the Prague/Electra Ethereum network upgrade.

Authors: Tim Beiko (@timbeiko)

Created: 2024-01-18

Discussion Link: <https://ethereum-magicians.org/t/eip-7600-hardfork-meta-prague-electra/18205>

Requires: EIP-2537, EIP-2935, EIP-3074, EIP-6110, EIP-7002, EIP-7281, EIP-7548, EIP-7669

➡ ? ➡

The diagram illustrates the sequence of Ethereum network upgrades from The Merge to The Split. It shows the following stages:

- The Merge:** Includes EIP-2537, EIP-2935, EIP-3074, EIP-6110, EIP-7002, EIP-7281, EIP-7548, and EIP-7669.
- The Surge:** Includes EIP-7600.
- The Storage:** Includes EIP-7600.
- The Prague:** Includes EIP-7600.
- The Split:** Includes EIP-7600.

Each stage is represented by a box containing a flowchart of the upgrade process, with arrows indicating the progression between stages.

- Plenty of 'next-hard-fork' discussions.
- 'Endgame' research relatively well understood.
- The middle-ground can be rather murky.
- 2024 – new perspectives & new issues!

<https://eips.ethereum.org/EIPS/eip-7600>

<https://twitter.com/VitalikButerin/status/1741190491578810445>

# Preliminaries

*Caveat emptor*



# Preliminaries

*Caveat emptor*



- Just the worldview of a few researchers!

# Preliminaries

*Caveat emptor*



- Just the worldview of a few researchers!
- Others have vastly different objectives and priorities ...

# Preliminaries

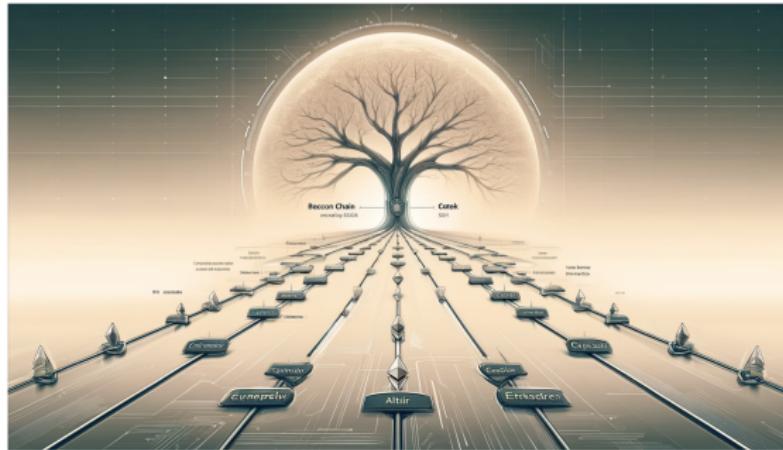
*Caveat emptor*



- Just the worldview of a few researchers!
- Others have vastly different objectives and priorities ...
- and that is by design!

## (recent) Past

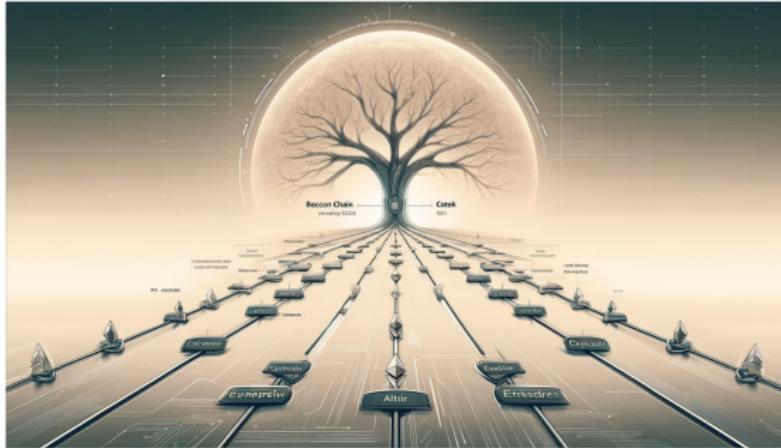
## *A hard-fork-centric retrospective*



<https://ethereum.org/en/history/>

## (recent) Past

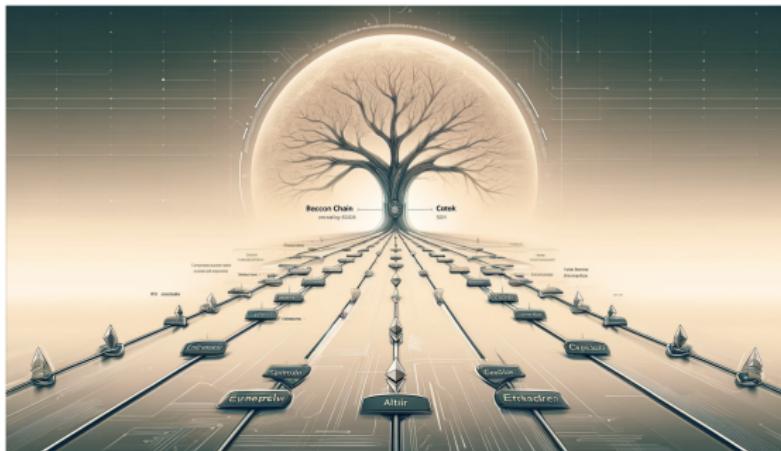
*A hard-fork-centric retrospective*



- December 1, 2020 – Beacon chain genesis.

# (recent) Past

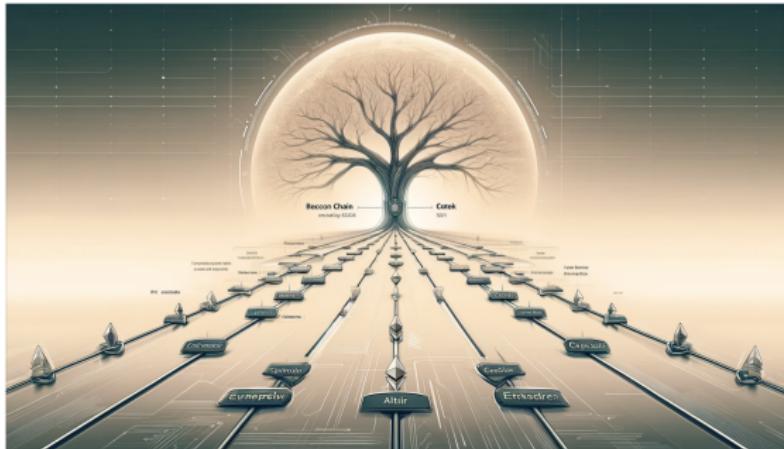
A hard-fork-centric retrospective



- December 1, 2020 – *Beacon chain genesis*.
- October 27, 2021 – *Altair* ('test hard-fork').

## (recent) Past

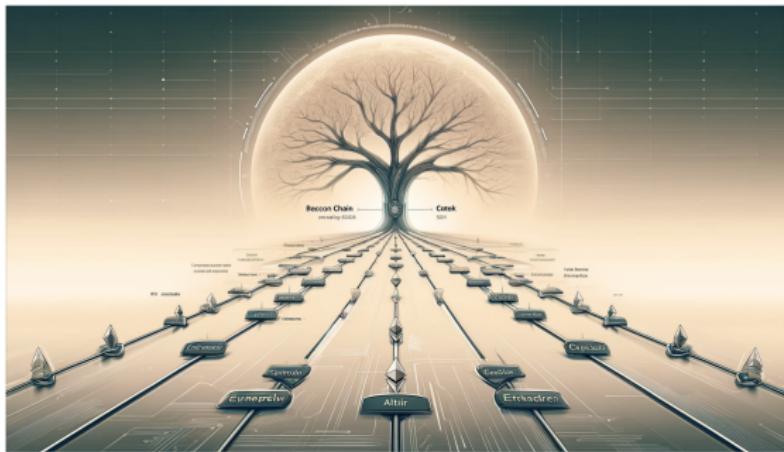
## *A hard-fork-centric retrospective*



- **December 1, 2020** – *Beacon chain genesis*.
  - **October 27, 2021** – *Altair* ('test hard-fork').
  - **September 15, 2022** – *Bellatrix* ("The Merge").

## (recent) Past

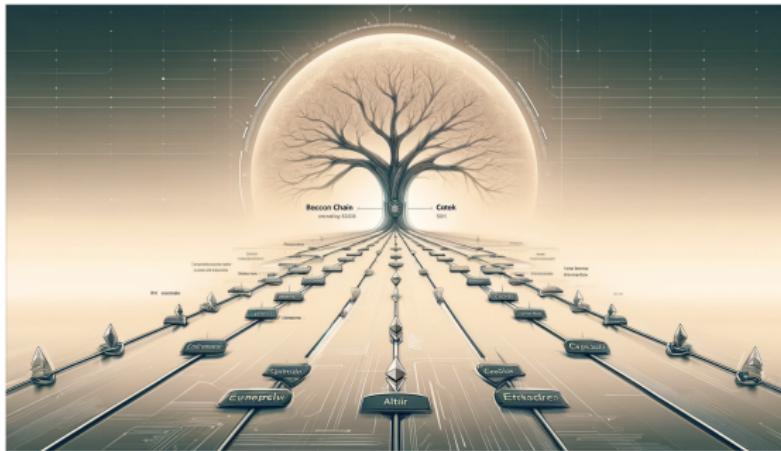
## *A hard-fork-centric retrospective*



- **December 1, 2020** – *Beacon chain genesis*.
  - **October 27, 2021** – *Altair* ('test hard-fork').
  - **September 15, 2022** – *Bellatrix* ("The Merge").
  - **April 12, 2023** – *Capella* (*Withdrawals activated*).

# (recent) Past

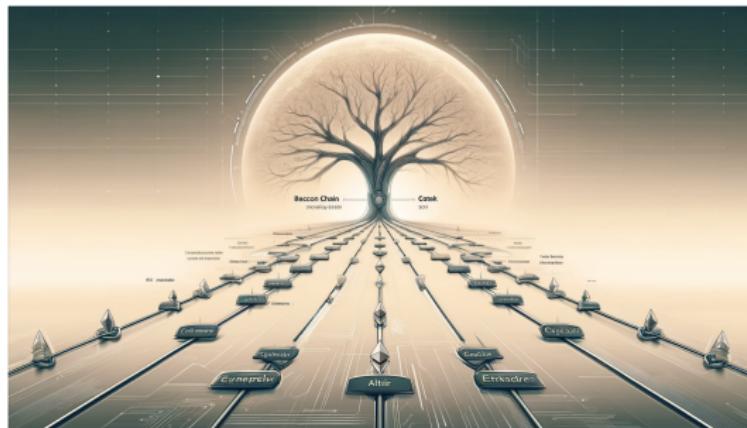
A hard-fork-centric retrospective



- **December 1, 2020** – *Beacon chain genesis.*
- **October 27, 2021** – *Altair* ('test hard-fork').
- **September 15, 2022** – *Bellatrix* ("The Merge").
- **April 12, 2023** – *Capella* (*Withdrawals activated*).
- **March 13, 2024** – *Deneb* (*Proto-Danksharding*).

# (recent) Past

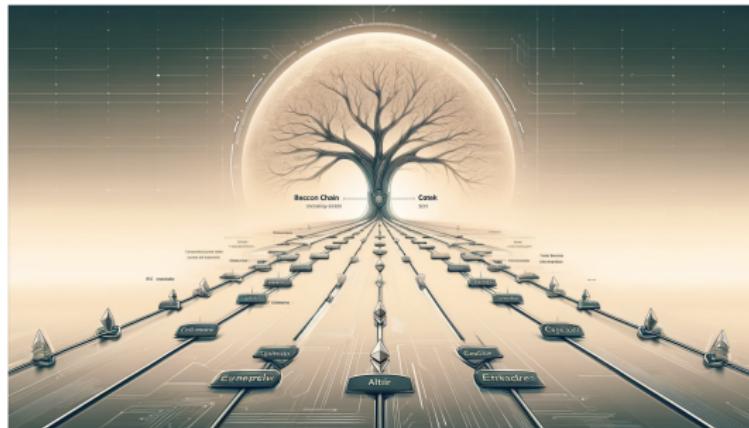
*A hard-fork-centric retrospective*



- December 2020 → April 2023: Proof-of-Stake Marathon.

## (recent) Past

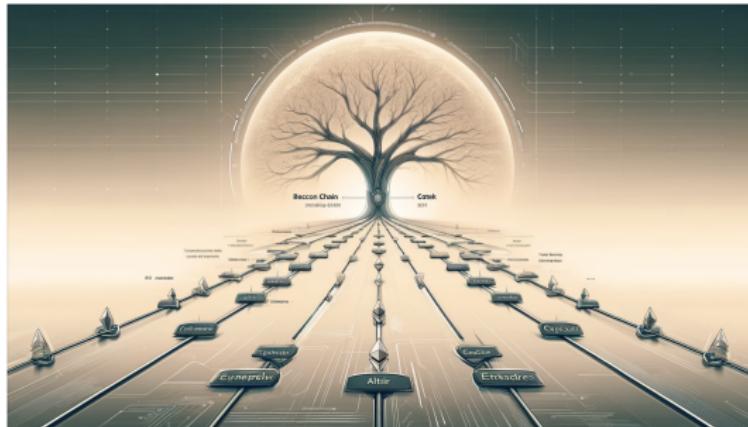
## *A hard-fork-centric retrospective*



- **December 2020 → April 2023:** Proof-of-Stake Marathon.
  - **April 2023 → April 2024:** ‘Rollup-centric roadmap’ via data sharding.

## (recent) Past

## *A hard-fork-centric retrospective*



- **December 2020 → April 2023:** Proof-of-Stake Marathon.
  - **April 2023 → April 2024:** ‘Rollup-centric roadmap’ via data sharding.
  - **April 2024 → future:** are we “there” yet?

# (recent) Past

*The rollup-centric roadmap*



# (recent) Past

*The rollup-centric roadmap*



- From Vitalik's October 2020 classic: "... where the base layer retrenches and focuses on doing a few things well - namely, consensus and data availability."

# (recent) Past

## *The rollup-centric roadmap*



- From Vitalik's October 2020 classic: "... where the base layer retrenches and focuses on doing a few things well - namely, consensus and data availability."
- Or in VC/marketing parlance, the "Modular Blockchain Thesis."

(soon™) Present

*(don't) Reject Modernity*



(soon™) Present

*(don't) Reject Modernity*



- Ethereum's upgrades make a lot of sense

(soon™) Present

*(don't) Reject Modernity*



- Ethereum's upgrades make a lot of sense
- ... but a lot has changed since 2020:

# (soon™) Present

*(don't) Reject Modernity*



- Ethereum's upgrades make a lot of sense
- ... but a lot has changed since 2020:
  - ▶ **MEV** – block building is highly centralized and increasing network fragility,

# (soon™) Present

*(don't) Reject Modernity*



- Ethereum's upgrades make a lot of sense
- ... but a lot has changed since 2020:
  - ▶ **MEV** – block building is highly centralized and increasing network fragility,
  - ▶ **Staking** – liquid staking & restaking shape staking demand, and

# (soon™) Present

*(don't) Reject Modernity*



- Ethereum's upgrades make a lot of sense
- ... but a lot has changed since 2020:
  - ▶ **MEV** – block building is highly centralized and increasing network fragility,
  - ▶ **Staking** – liquid staking & restaking shape staking demand, and
  - ▶ **Scaling** – we expect blob demand to increase.

# (soon™) Present

*Ethereum goals and non-goals*



# (soon™) Present

*Ethereum goals and non-goals*



- Ethereum has (and aims to preserve)

# (soon™) Present

*Ethereum goals and non-goals*



- Ethereum has (and aims to preserve)
  - ▶ meaningful decentralization of the validator set,

# (soon™) Present

*Ethereum goals and non-goals*



- Ethereum has (and aims to preserve)
  - ▶ meaningful decentralization of the validator set,
  - ▶ an exceptional community, and

# (soon™) Present

*Ethereum goals and non-goals*



- Ethereum has (and aims to preserve)
  - ▶ meaningful decentralization of the validator set,
  - ▶ an exceptional community, and
  - ▶ ETH the asset.

# (soon™) Present

*Ethereum goals and non-goals*



- Ethereum has (and aims to preserve)
  - ▶ meaningful decentralization of the validator set,
  - ▶ an exceptional community, and
  - ▶ ETH the asset.
- Ethereum does not aim to

# (soon™) Present

*Ethereum goals and non-goals*



- Ethereum has (and aims to preserve)
  - ▶ meaningful decentralization of the validator set,
  - ▶ an exceptional community, and
  - ▶ ETH the asset.
- Ethereum does not aim to
  - ▶ provide the most hospitable L1 execution environment,

# (soon™) Present

*Ethereum goals and non-goals*



- Ethereum has (and aims to preserve)
  - ▶ meaningful decentralization of the validator set,
  - ▶ an exceptional community, and
  - ▶ ETH the asset.
- Ethereum does not aim to
  - ▶ provide the most hospitable L1 execution environment,
  - ▶ sacrifice decentralization for scalability, or

# (soon™) Present

*Ethereum goals and non-goals*



- Ethereum has (and aims to preserve)
  - ▶ meaningful decentralization of the validator set,
  - ▶ an exceptional community, and
  - ▶ ETH the asset.
- Ethereum does not aim to
  - ▶ provide the most hospitable L1 execution environment,
  - ▶ sacrifice decentralization for scalability, or
  - ▶ operate like a startup.

(short/medium-term) Future

*Disclaimer #2 (opinion forthcoming)*



## (short/medium-term) Future

*Disclaimer #2 (opinion forthcoming)*



- Given the \*extreme\* scarcity of network upgrade bandwidth, pivotal decisions approach in the next few years.

## (short/medium-term) Future

*Disclaimer #2 (opinion forthcoming)*



- Given the \*extreme\* scarcity of network upgrade bandwidth, pivotal decisions approach in the next few years.
- This is an opinion on the focal point of these decisions...

# (short/medium-term) Future

To Prague/Electra



# (short/medium-term) Future

To Prague/Electra



- “Hard-forks are like music festivals.” – Tim Beiko

# (short/medium-term) Future

To Prague/Electra



- “Hard-forks are like music festivals.” – Tim Beiko
- What's in Prague/Electra?

# (short/medium-term) Future

To Prague/Electra



- “Hard-forks are like music festivals.” – Tim Beiko
- What’s in Prague/Electra?
  - ▶ Intended to be a “small fork,” targetting EOY-2024.

# (short/medium-term) Future

To Prague/Electra



- “Hard-forks are like music festivals.” – Tim Beiko
- What's in Prague/Electra?
  - ▶ Intended to be a “small fork,” targetting EOY-2024.
  - ▶ Headliners: EIP-3074 (account abstraction), EIP-7251 (increase MAX\_EFFECTIVE\_BALANCE).

# (short/medium-term) Future

To Prague/Electra



- “Hard-forks are like music festivals.” – Tim Beiko
- What’s in Prague/Electra?
  - ▶ Intended to be a “small fork,” targetting EOY-2024.
  - ▶ Headliners: EIP-3074 (account abstraction), EIP-7251 (increase MAX\_EFFECTIVE\_BALANCE).
- IMO, these were the the wrong choices.

# (short/medium-term) Future

To Prague/Electra



- “Hard-forks are like music festivals.” – Tim Beiko
- What’s in Prague/Electra?
  - ▶ Intended to be a “small fork,” targetting EOY-2024.
  - ▶ Headliners: EIP-3074 (account abstraction), EIP-7251 (increase MAX\_EFFECTIVE\_BALANCE).
- IMO, these were the the wrong choices.
- Addressing censorship, scaling blob throughput, and accounting for staking demand remain the elephants in Ethereum’s room.

# (short/medium-term) Future *& Beyond*



---

<https://eips.ethereum.org/EIPS/eip-7547>

<https://ethresear.ch/t/peerdas-a-simpler-das-approach-using-battle-tested-p2p-components/16541>

<https://ethereum-magicians.org/t/electra-issuance-curve-adjustment-proposal/18825>

# (short/medium-term) Future *& Beyond*



- ... which makes Osaka (the fork following Prague/Electra) critically important (earliest timing EOY-2025).

---

<https://eips.ethereum.org/EIPS/eip-7547>

<https://ethresear.ch/t/peerdas-a-simpler-das-approach-using-battle-tested-p2p-components/16541>

<https://ethereum-magicians.org/t/electra-issuance-curve-adjustment-proposal/18825>

# (short/medium-term) Future *& Beyond*



- ... which makes Osaka (the fork following Prague/Electra) critically important (earliest timing EOY-2025).
- A dream fork

---

<https://eips.ethereum.org/EIPS/eip-7547>

<https://ethresear.ch/t/peerdas-a-simpler-das-approach-using-battle-tested-p2p-components/16541>

<https://ethereum-magicians.org/t/electra-issuance-curve-adjustment-proposal/18825>

# (short/medium-term) Future *& Beyond*



- ... which makes Osaka (the fork following Prague/Electra) critically important (earliest timing EOY-2025).
- A dream fork
  - ▶ address censorship with Inclusion Lists,

---

<https://eips.ethereum.org/EIPS/eip-7547>

<https://ethresear.ch/t/peerdas-a-simpler-das-approach-using-battle-tested-p2p-components/16541>

<https://ethereum-magicians.org/t/electra-issuance-curve-adjustment-proposal/18825>

# (short/medium-term) Future *& Beyond*



- ... which makes Osaka (the fork following Prague/Electra) critically important (earliest timing EOY-2025).
- A dream fork
  - ▶ address censorship with Inclusion Lists,
  - ▶ scale blobs with PeerDAS, and

---

<https://eips.ethereum.org/EIPS/eip-7547>

<https://ethresear.ch/t/peerdas-a-simpler-das-approach-using-battle-tested-p2p-components/16541>

<https://ethereum-magicians.org/t/electra-issuance-curve-adjustment-proposal/18825>

# (short/medium-term) Future *& Beyond*



- ... which makes Osaka (the fork following Prague/Electra) critically important (earliest timing EOY-2025).
- A dream fork
  - ▶ address censorship with Inclusion Lists,
  - ▶ scale blobs with PeerDAS, and
  - ▶ adjust issuance to preserve viability of unstaked ETH.

---

<https://eips.ethereum.org/EIPS/eip-7547>

<https://ethresear.ch/t/peerdas-a-simpler-das-approach-using-battle-tested-p2p-components/16541>

<https://ethereum-magicians.org/t/electra-issuance-curve-adjustment-proposal/18825>

# The capital 'F', Future

*tl;dl; (too long; didn't listen;)*



**stokes**

@ralexstokes

...

ethereum is first and foremost a cultural project, we just happen to use software for the leverage

3:14 PM · Dec 19, 2022 · **47.3K** Views

21

53

285

16

↑

# The capital 'F', Future

*tl;dl; (too long; didn't listen;)*



**stokes**

@ralexstokes

...

ethereum is first and foremost a cultural project, we just happen to use software for the leverage

3:14 PM · Dec 19, 2022 · **47.3K** Views

21

53

285

16

↑

- Ethereum is great because the people make it great...

# The capital 'F', Future

*tl;dl; (too long; didn't listen;)*



**stokes**

@ralexstokes

...

ethereum is first and foremost a cultural project, we just happen to use software for the leverage

3:14 PM · Dec 19, 2022 · **47.3K** Views

21

53

285

16

↑

- Ethereum is great because the people make it great...
- but the job is not done yet.

thanks! :-)

