

Overload the execution proposer! From MEV-Boost to ePBS to APS

ZuBerlin MEV day / preconf.wtf — 13/06/2024


Barnabé Monnot

Robust Incentives Group (RIG), Ethereum Foundation

Why look towards APS (attester-proposer separation)?

Meanwhile the benefits of APS are significant imo:

1 1 107

 **barnabe.eth**
@barnabemonnot

- Firewall timing games from consensus
- Remove most of MEV reward variability from validators
- Clean protocol interface that doesn't overdetermine the building rights market

Conceptual unlocks

- The difference between **proposing** and **building** rights.
- The difference between **proposing** and **delivering** a block/payload.
- The difference between **beacon proposing** and **execution proposing**.
- Capturing the value of **execution proposing rights**, not just **building rights**.

Towards PBS




Proposing vs building rights

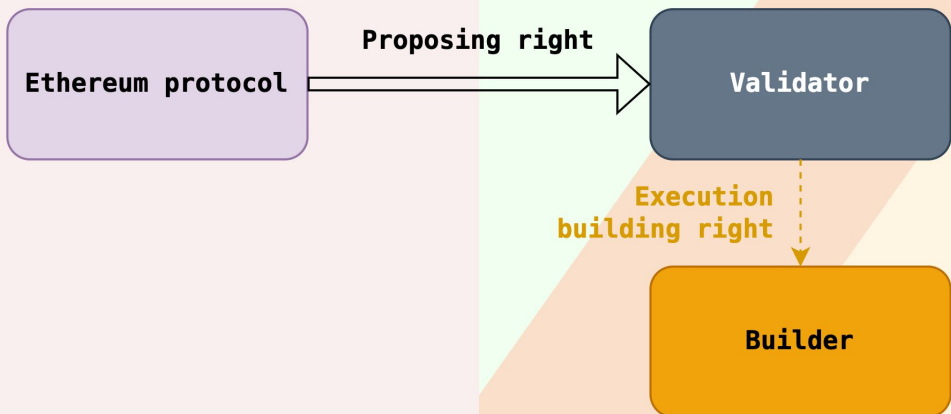
Protocol gives *proposing rights* to validators

 **Proposing:** Signing off on a commitment to *all* block contents

Validators figured out that they could originate and sell
building rights

 **Building:** Choosing an ordered sequence of transactions

MEV-Boost: Validators call upon builders



1. Combined beacon proposing
+ execution proposing
+ delivery of block

⌚ **Timing games**
Beacon block ✅

Validator commits off-chain
to builder block.

What we have today

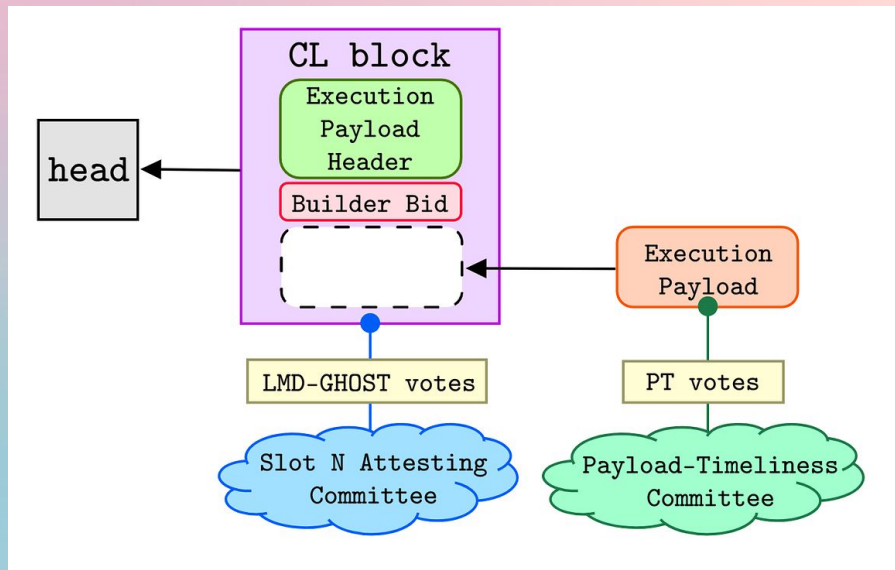
- Validator-as-proposer 🖋️ sells building rights 🛠️ to a builder.
- Fair exchange organised by trusted third party (relay).

[More pictures about proposers and builders](#)

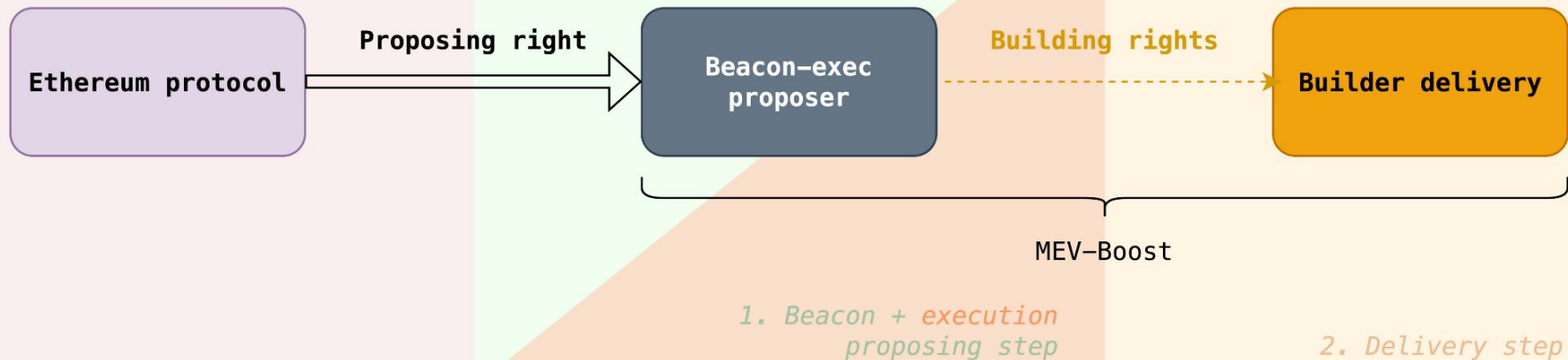
Fair exchange via protocol

Recent work by [Potuz and Terence](#) on specifying the ePBS [“PTC” \(Payload Timeliness Committee\)](#) design by mike+fradam.

Surfaced interesting directions and new momentum towards enshrining.




Block-auction ePBS



Timing games

Beacon 

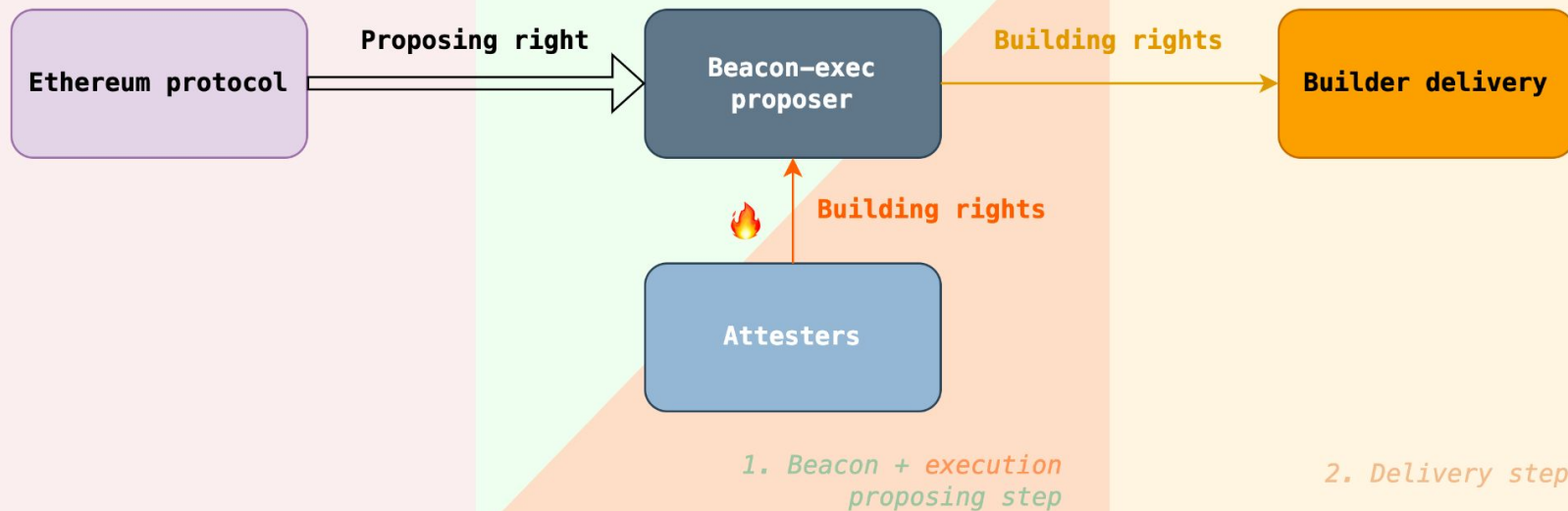
Execution 

Beacon + execution proposer commits to builder and block contents.
Can commit to self/local building.

Committed builder must deliver a block, satisfying commitment to contents.

Questions: Direct connections with proposers/sealed bids?
Bid cancellations? Bypassability?

MEV-Burn ePBS



Timing games

Beacon 

Execution 

Attesters constrain the beacon-exec proposer to allocate the building rights to the highest bidder.

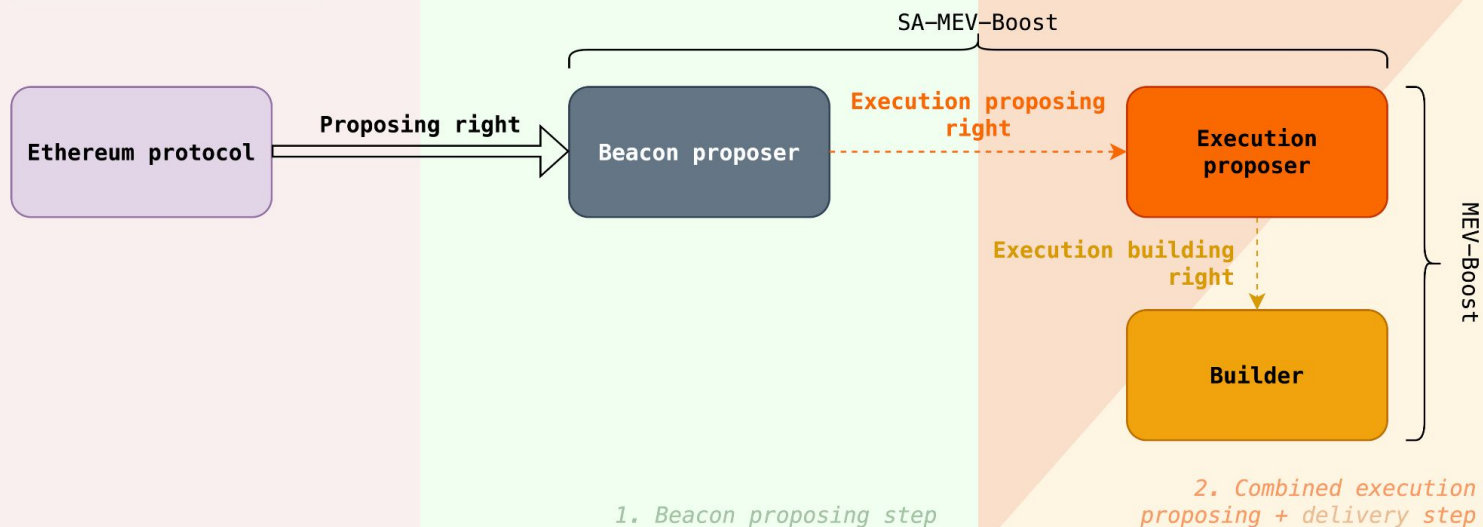
Committed builder must deliver a block, satisfying commitment to contents.

Questions: Value-in-flight problem? Preconfirmations?

Towards APS



Slot-auction ePBS



Timing games

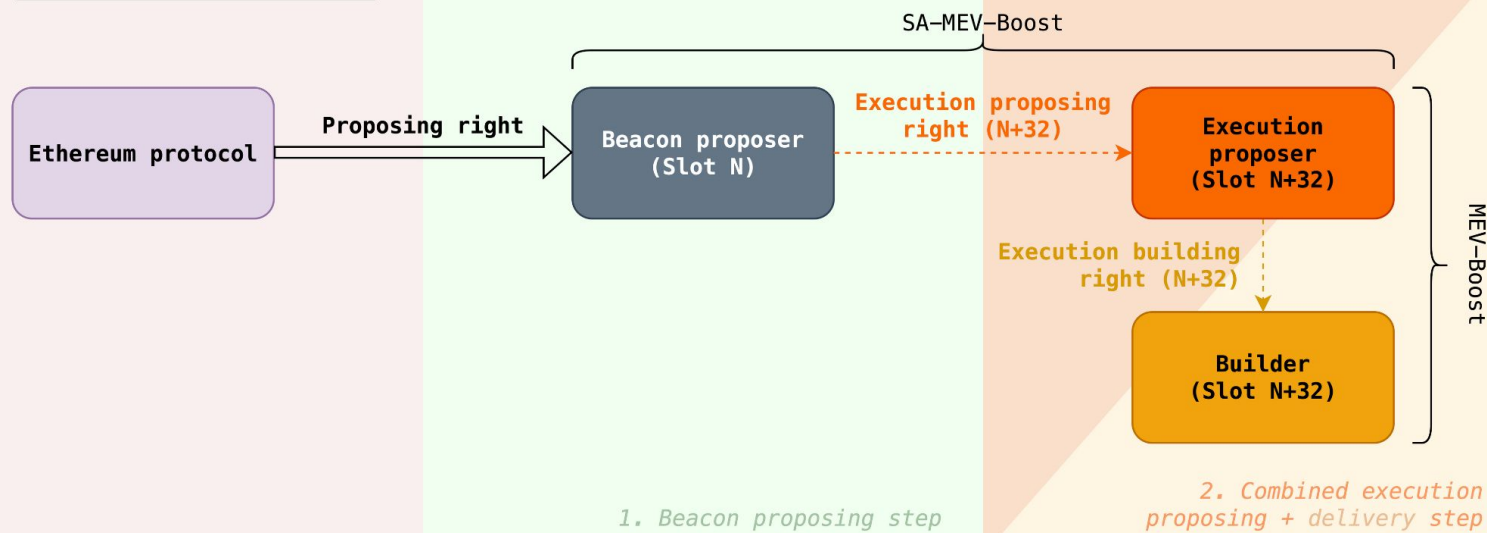
Beacon ?
Execution ✓

Beacon proposer commits to
execution proposer.
Beacon proposer can commit to self.

Execution proposer may use
MEV-Boost for last-mile building.

Questions: PTC design doesn't work? Deal with equivocations?
Bypassability x2? Are execution proposers builders too?

Slot-auction+32 ePBS



Timing games

Beacon ?
Execution ✓

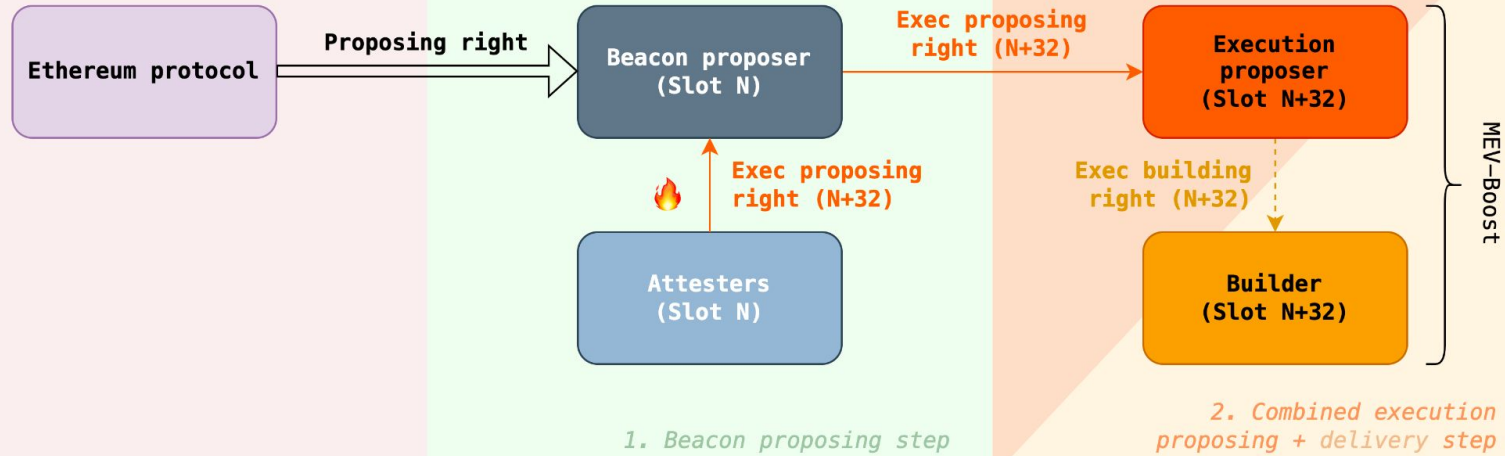
Beacon proposer at slot N commits to execution proposer at slot N+32. Beacon proposer can commit to self.

Execution proposer may use MEV-Boost for last-mile building.

Questions: Need SSF? Early auction value leakage?

Can do spot ILs, but is that priced in the bid? (inefficiency?)

Execution auction



Timing games
Beacon
Execution

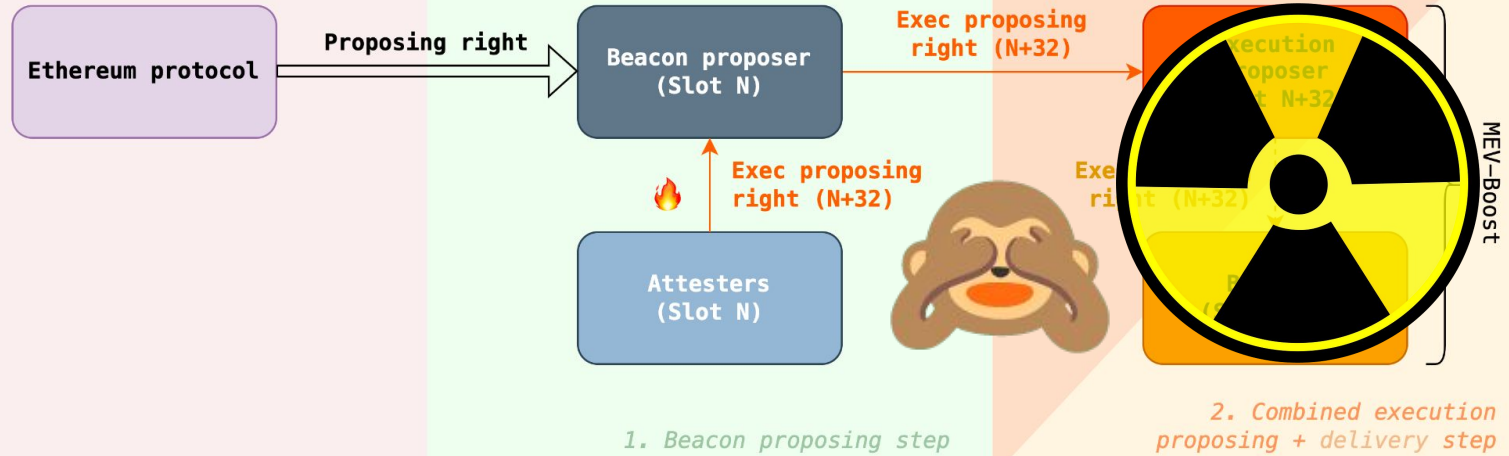
Beacon proposer at slot N commits to highest bid observed.
Attesters enforce the choice.

Execution proposer selected by MEV-Burn gadget.
MEV-Boost for last-mile building.

Questions: MEV-Burn collusion?

Value leakage during MEV-Burn execution? Multi-block MEV?

Execution auction



Timing games

Beacon



Execution

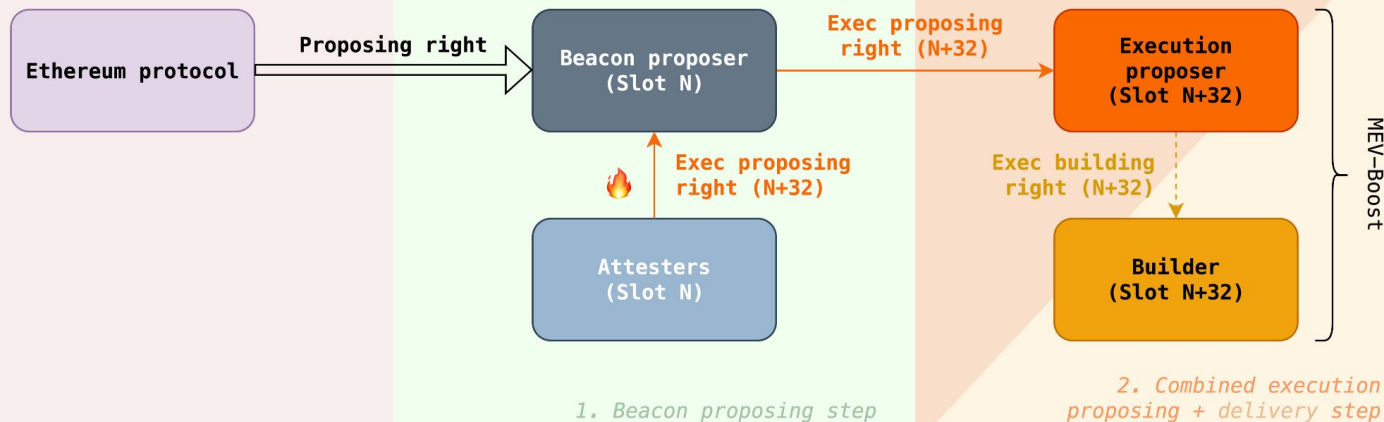


Beacon proposer at slot N commits to highest bid observed.
Attesters enforce the choice.

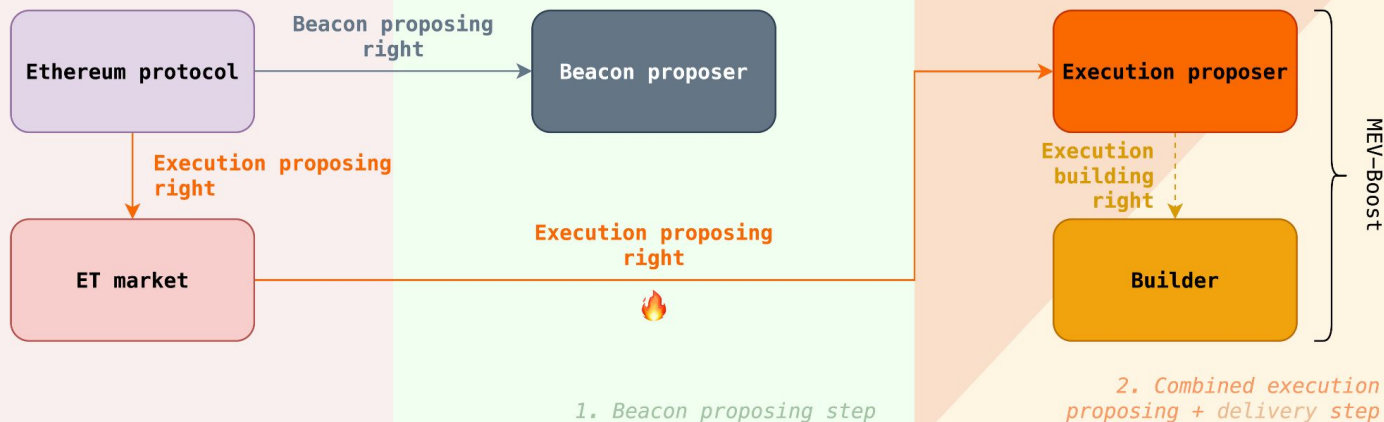
Execution proposer selected by MEV-Burn gadget.
MEV-Boost for last-mile building.

break stuff here bitte

Execution auction



Execution Tickets (ETs)

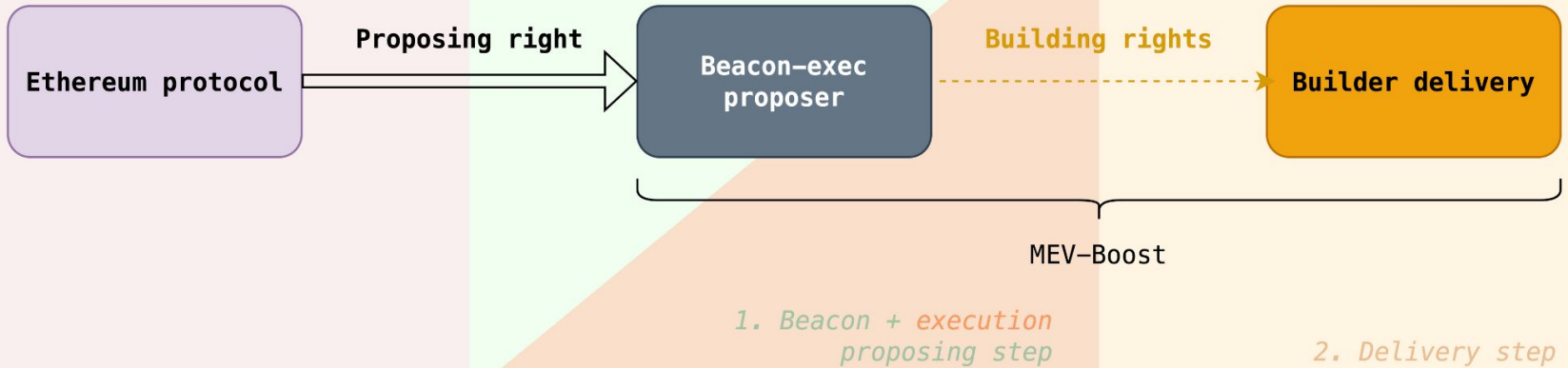


- Ticket MEV?
- Redemption/activation?
- Sale mech.?

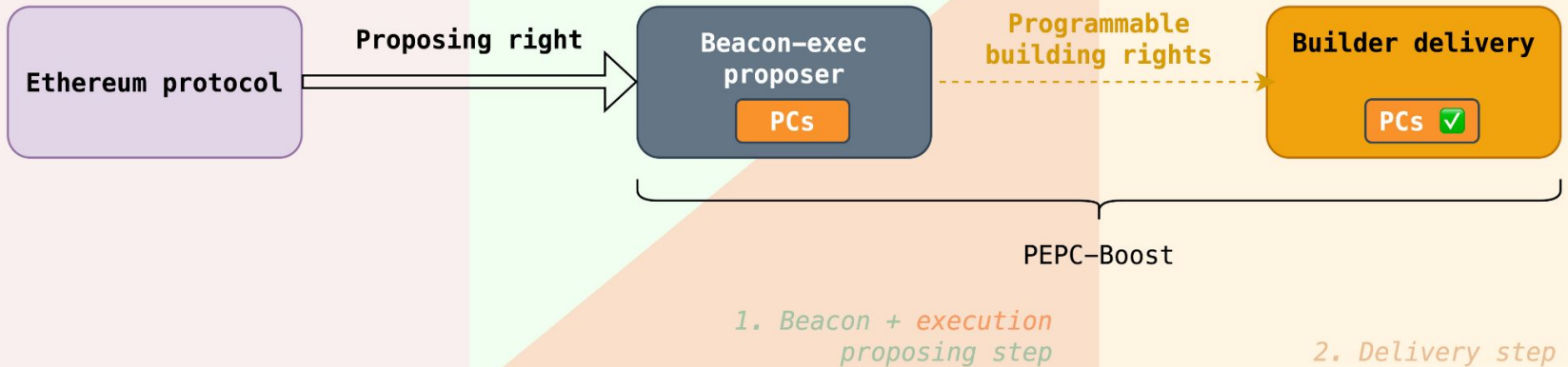
PEPC tangent



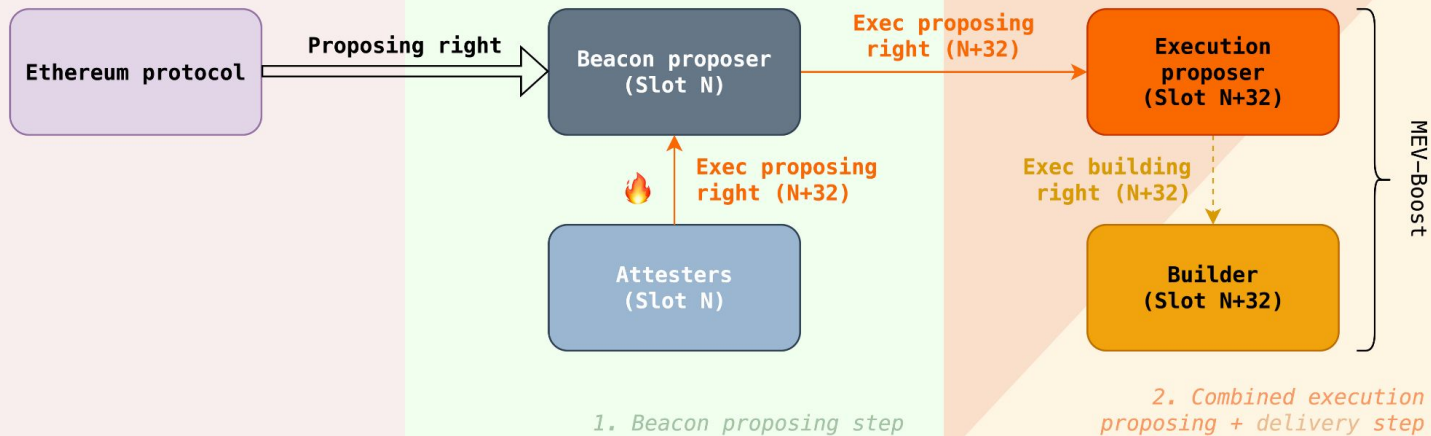
Block-auction ePBS



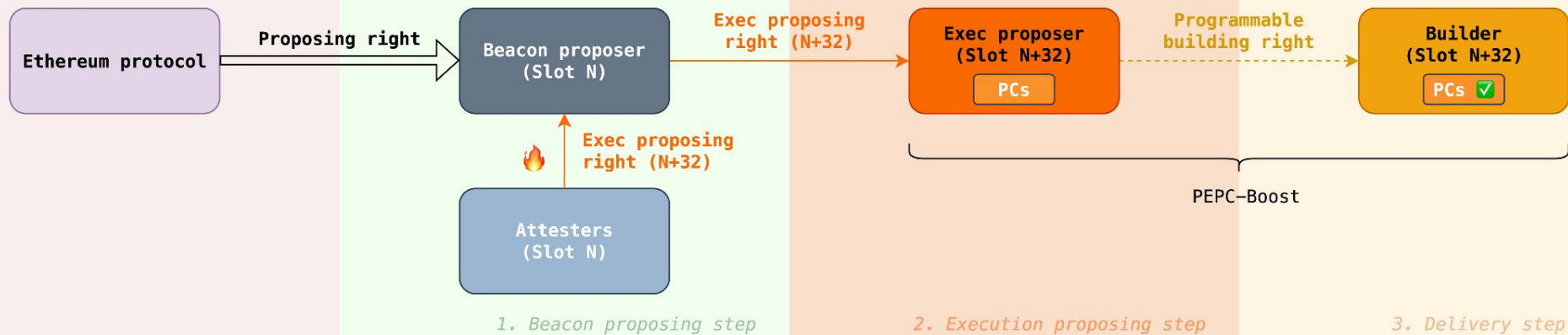
Block-auction PEPC



Execution auction



Execution auction + PEPC 🤔



Thank you!

<https://rig.ethereum.org>

bro just one
more pbs design please
bro i swear it's the
last one this one's
going to solve everything
and decentralise
builders too no more timing
games bro i promise
bro just one last pbs
design this one's called
APS it's totally different bro

