

The BoLD paper is awesome! Permissionlessness is crucial for validation. I was wondering how many stakes the defenders can be forced to submit in the multi-level setting.

From the paper:

3.4.5 Staking

. A party who creates a level-zero edge must submit a stake S

which they should expect to lose if their edge is incorrect. If there are L

level-zero edges, the total stakes will be LS

.

When a lower challenge is started, any party can create a level-zero edge in the lower challenge

Within each challenge or sub-challenge, the basic protocol is executed as described in the previous section.

I understand this as meaning that for each sub-challenge a party wishes to create a top-level edge, they'd need to submit another stake. This makes sense to me, otherwise I see the risk of a Sybil attack.

With this in mind, considering a two-level challenge, what would happen if the attackers create X

different top-level edges at the first level? Would it force X

level-two sub-challenges, in which defenders would have to submit another stake for each sub-challenges, for a total of X new stakes?

Here's a step by step of what I'm trying to describe.

Defender: creates the honest top-level edge in level-one challenge, submitting 1 stake.

Attacker: creates X

dishonest top-level edges in level-one challenge, submitting X stakes.

Defenders and attackers: play the standard game by creating further child edges, "chasing" each other in parallel. My understanding is that both attacker and defender would end up submitting $X * \log_2$ (steps)

edges. At this point, I believe there'll be a total of X

one-step forks in the challenge, starting X

sub-challenges.

Is the next step for the defender to create X

honest top-level edges, one in each new sub-challenge, submitting one new stake for each?