This is an interesting post.

mikeneuder:

Case 1 >Case 2 > Case 3 > Case 4

How do you distinguish Case 2 from 3 and why? are validators ordered? or you chose an order based on other indicators from the block?

Also I find the wording a little confusing: PB is not applied in the event of forks, is not something that one chooses to apply when making binary comparisons, the PB is applied to the full node for a prescribed amount of time, and this weight is used when comparing against anything, it's a property of the node and not a property of a pair of nodes being compared. If we had to decide to apply or not when comparing two different heads, the complexity finding the best head would increase by an order of magnitude.

As an example of the question consider the following fork using more or less your notation:

Here slot N is the root, N+1 was seen only by 35% of the chain, the remaining set of people did not see it on time so they voted for N. All validators eventually saw the blocks by the time that N+2 starts. And now we have a fork of case 2 and case 3. According to your rule, the (blue, white)

node will get a higher proposer boost than the (white, red)

one so I assume that the (blue, white)

node would win among those two. How about wrt the comparison with the previous head of the network, the (blue, red)

node in slot N+1? This is a case 1 node. I assume PB still applies based in that they are in different slots, but what is the value that this node has? is it the full PB? that is, you give PB to the highest case for the given slot?, if that´s the case then for a PB of 40% then the slot in N+2 will win here, if you only give them when comparing among cases, then the case 2 block in N+2 would not be given PB when comparing with the case 1 block in N+1. So then N+1 remains the head. I am assuming that you meant the former case here.

mikeneuder:

that takes as input the tip t corresponding to the tip in the write operation write(·,t) and outputs the minimum cost that a motivated adversary would have to pay to make the write fail.

Why are we measuring censor resistance with respect to the tip? It is important that the cost of censoring goes to infinity as K grows even for t=0 (or whatever minimum is enforced) and we want this growth to be supra-linear. I don't mind this definition much, since from D I can get this cost as D(0). However, in this case you need to give me an order relation in the set of censor resistance mappings, that is, for two such systems D, D', what does it mean to have D < D'?