

Abstract: A growing number of products use layer 2 solutions to expand the capabilities of primary blockchains like Ethereum, where computation is off-loaded from the root chain, and the results are published to it in bulk. Those include optimistic and zero-knowledge rollups, information oracles, and app-specific chains. This work presents an analysis of layer 2 blockchain strategies determining the optimal times for publishing transactions on the root chain. There is a trade-off between waiting for a better layer 1 gas price and the urgency to finalize layer 2 transactions. We present a model for the problem that captures this trade-off, generalizing previous works, and we analyze the properties of optimal publishing strategies. We show that such optimal strategies hold a computable simple form for a large class of cost functions.

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Optimal Publishing Strategies on a Base Layer

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