L2 Specific MEV Mitigation Strategies

Ethereum is Leading The Way

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Ethereum: The World Ledger

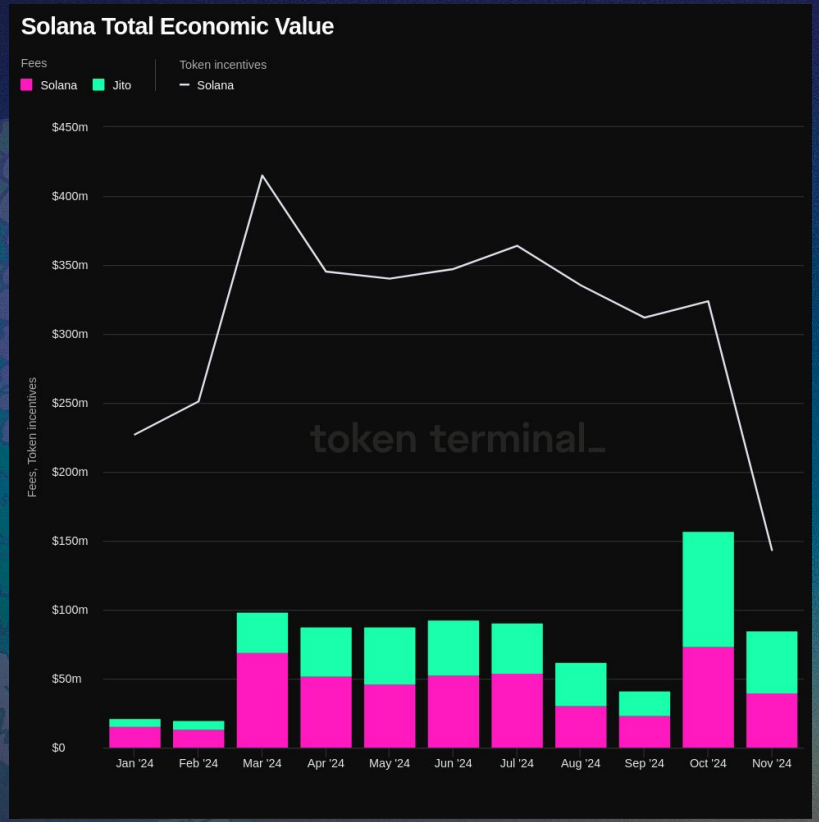
Growth and Use Above Short-Term Yield Generation

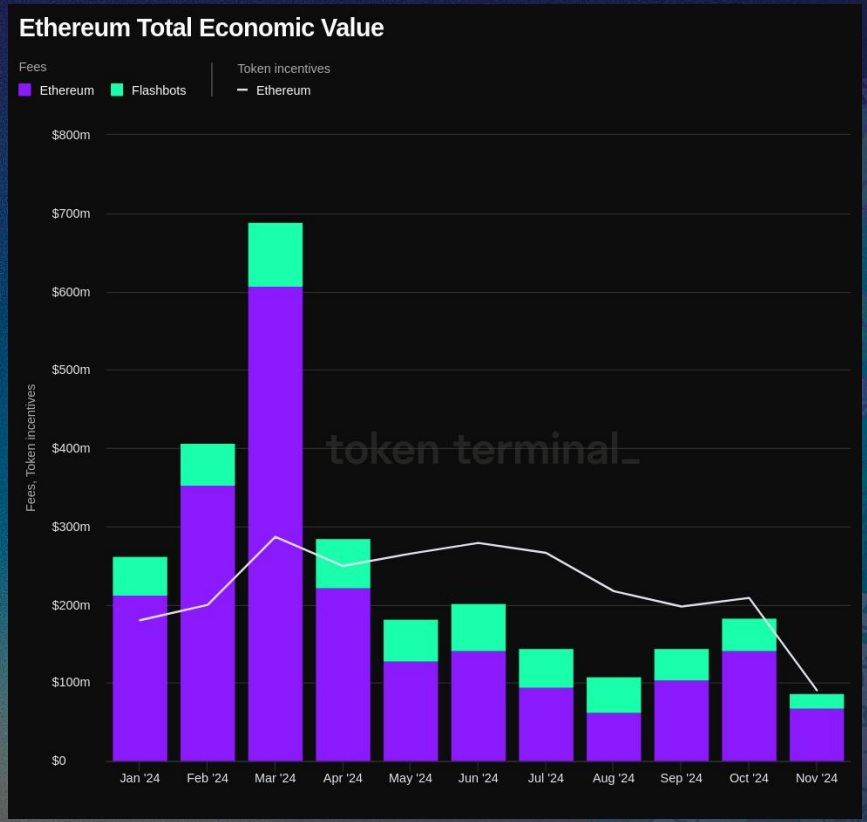
Pathological MEV as Overhead

Sandwiching, etc. Grandma is going to hate getting sandwiched more than you do. Taking over tradfi will require fixing this chronic problem.

Case Study: Solana. MEV is now over half the transaction cost paid by users in aggregate. Even Ethereum L1 is nowhere near that. To properly compare Ethereum with Solana requires including MEV cost!

Solana vs. Ethereum: Proportion of MEV





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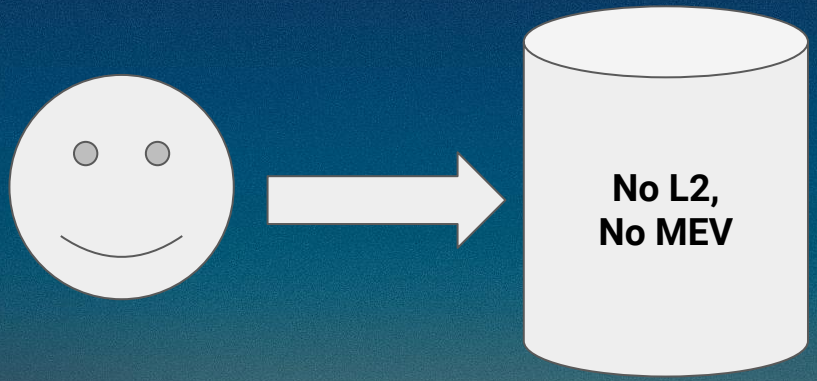
MEV cannot be easily tuned. Either you have it or you don't. It isn't like transaction fees which can be adjusted by changing block capacity/gas limits. **THIS IS A BIG PROBLEM. Chains with pathological MEV will be less competitive long-term!**

Is Ethereum Positioned to Effectively Eliminate Detectable MEV?

YES.

Plans and development in the Ethereum community *years ago* have already prepared us for elimination of detectable pathological MEV today.

No L2 Example: It really is this simple.



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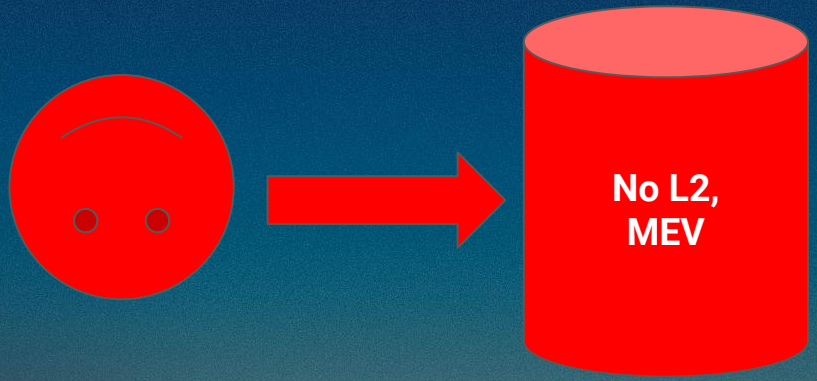
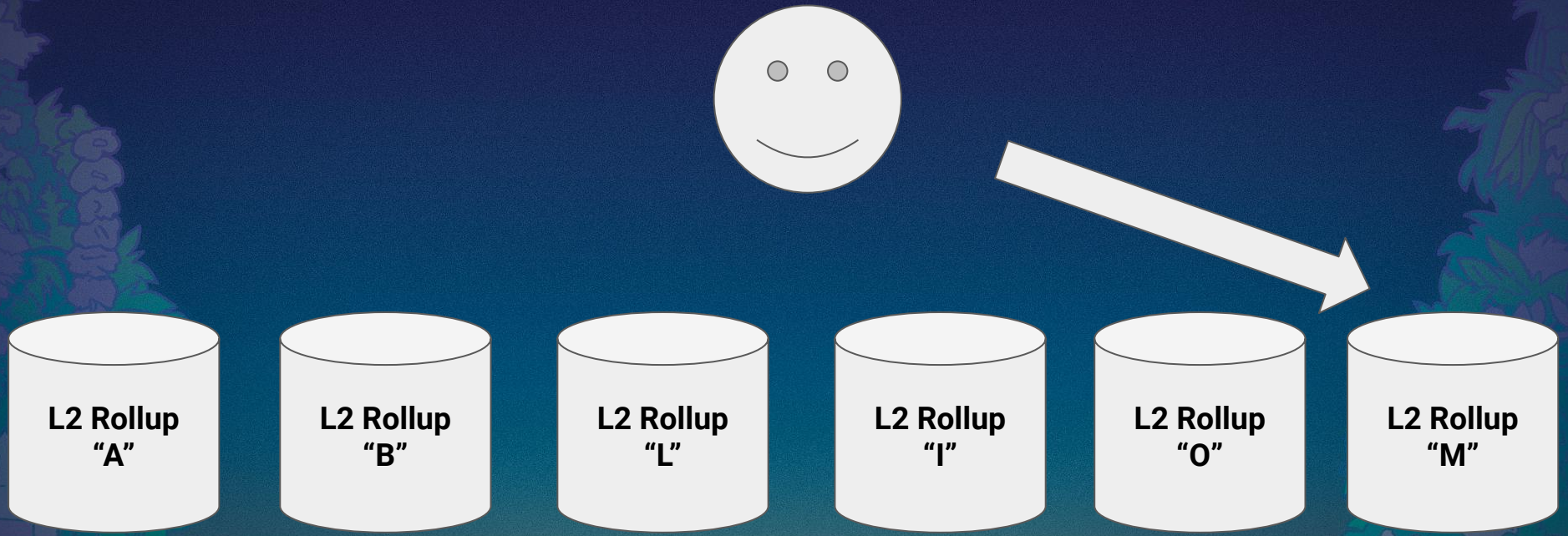


Ethereum L2: Sequencer Choice and MEV



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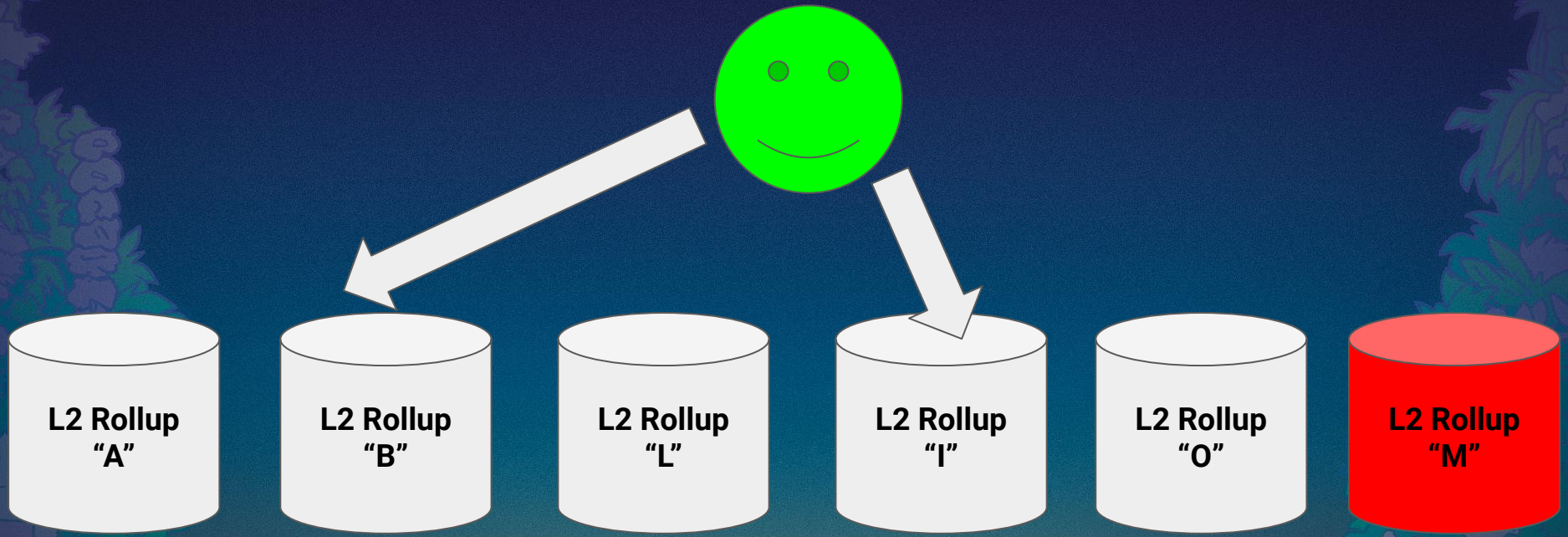

It really is that simple.

Competitive Parallel Sequencing solves MEV

Multiple L2s are actually multiple sequencers. This brings about sequencer choice. If one L2 starts conducting MEV, then users will route around damage and shift to a more friendly L2.

Ethereum L2 Rollups are actually an MEV solution! Not just for scaling.

The "Anti-L2 Thesis" results in MEV or centralization. Solana's L1 focused thesis will increase MEV, without any clear mitigations beyond centralizing the chain further. Approaches which attempt to solve this end up reinventing L2 designs. This **requires investment of years of development** across contracts, user behavior, wallet, and infrastructure.

TEEs on the L1 don't solve this problem either. Might as well co-locate at Intel's data center. Sequencer can still control which transactions get accessed (assuming no latency trade-off).

Working on an L2? Publicly commit to refuse to do pathological MEV. This is a *competitive advantage* .

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What else can you do?

Reduce Switching Costs Between L2s!

From AMMs to RFQs, Intents, and Order Books. The AMM design has significant network effects which imply high switching costs. **“Split Liquidity” is a function of AMMs**.

What does all the new stuff need? Revert Protection!

Revert Protection

Revert Protection

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Revert Protection

EVERYONE WANTS REVERT PROTECTION DO IT NOW

Revert protection exists on L1 via MEV services, but is necessary on L2s.

RFQs, Intents, and Order Books need revert protection. Currently, RFQ spreads are *wider* on L2s! Transaction contention is a BIG PROBLEM for L2s. These tech mitigate the network effects of AMM on a single L2. Speed helps a lot, but revert protection helps more. **Decentralized Intents are basically broken without revert protection**. This is easy to do on many L2s, sequencer doesn't include reverted txes.

The pathological MEV people, ironically, want it too! See: Quantifying the Value of Revert Protection (Zhu et. al, 2024). https://arxiv.org/abs/2410.19106

Proposal to Implement Decentralized Revert Protection In L1 as well (Inactive): EIP-7640, pull 8267 https://github.com/ethereum/EIPs/pull/8267

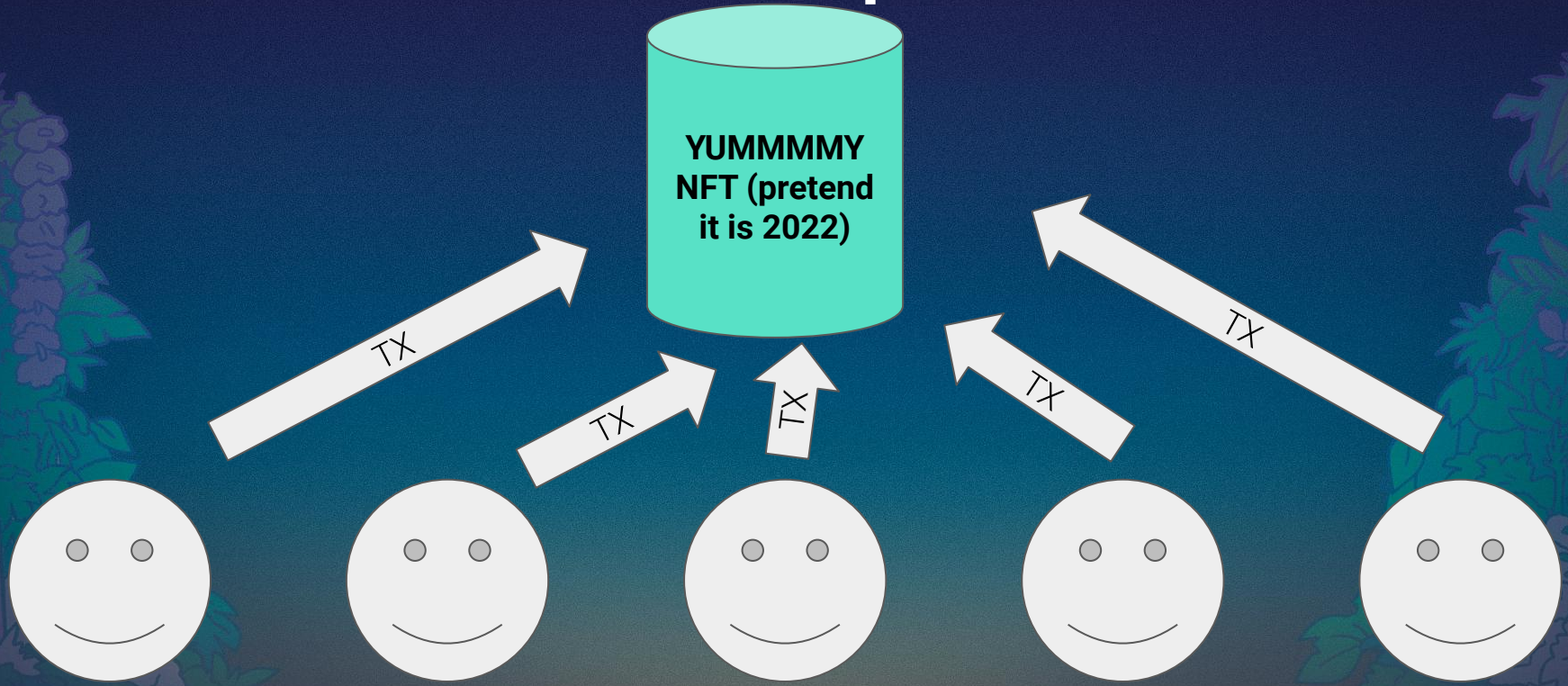
Obfuscated MEV Mindset: How to think about MEV

This is going to be obvious. You already know all these facts, but there is great importance to the mindset and where the attention is focused.

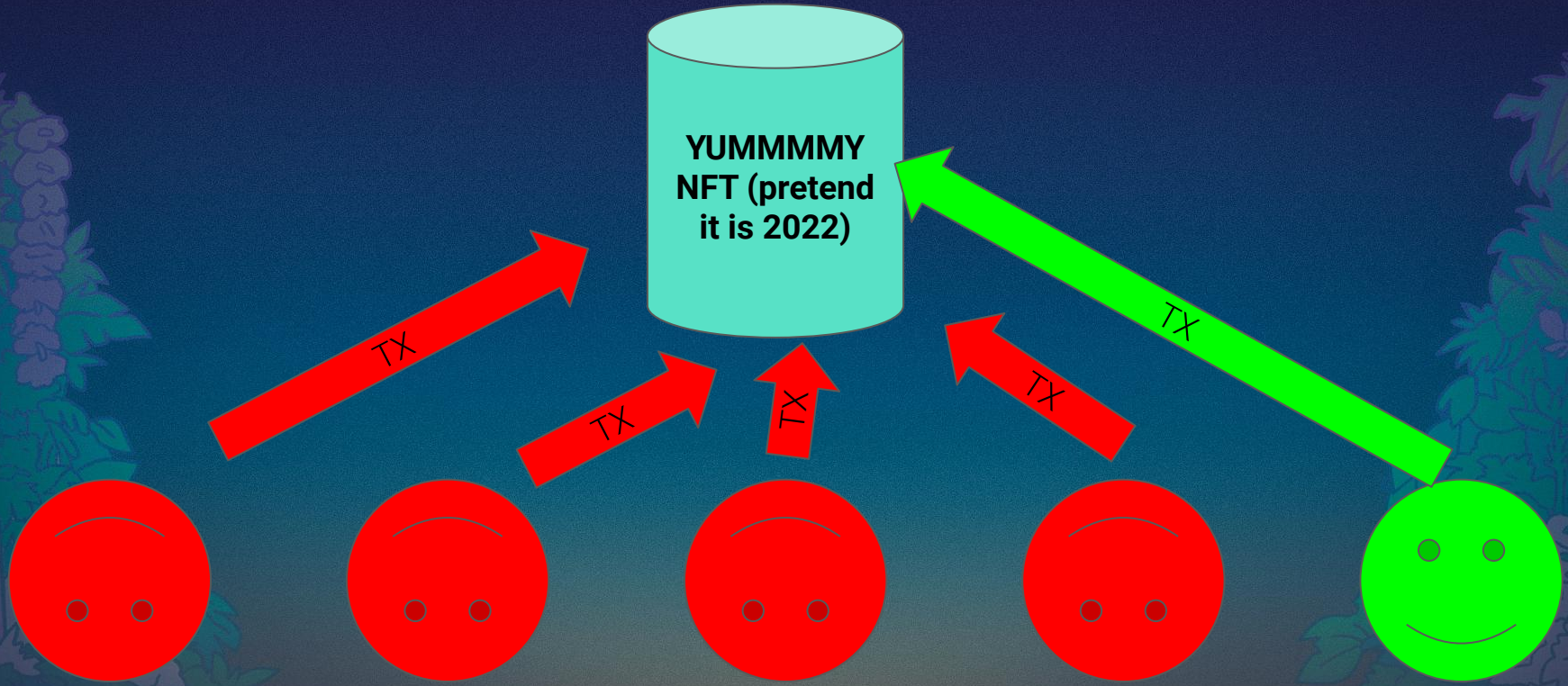
Everyone talks about searchers, sequencers, bundles, etc. You skipped a step.

The real first step of understanding MEV is Revert Protection, because MEV at its core is a monetized Revert Protection service.

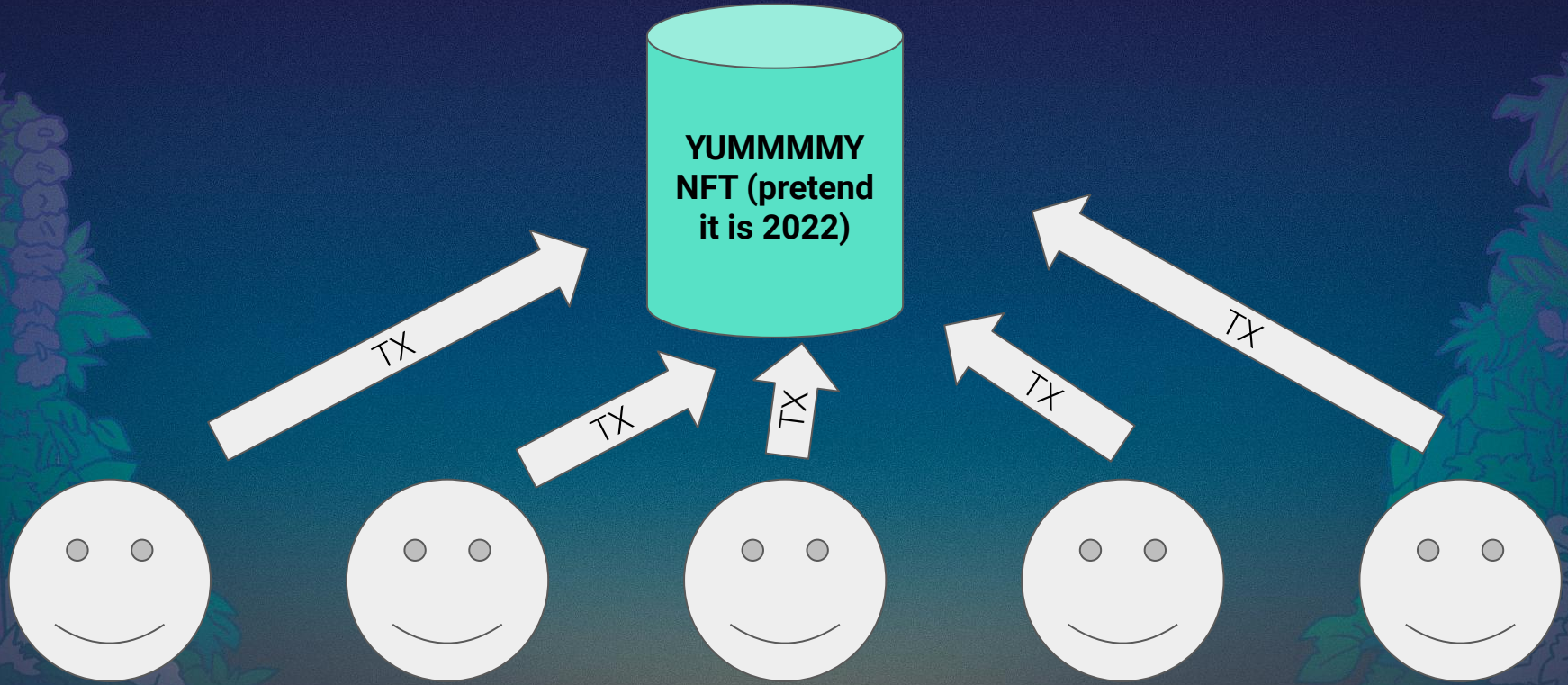
Example: NFT Sale at Midnight, no Revert Protection Public Mempool



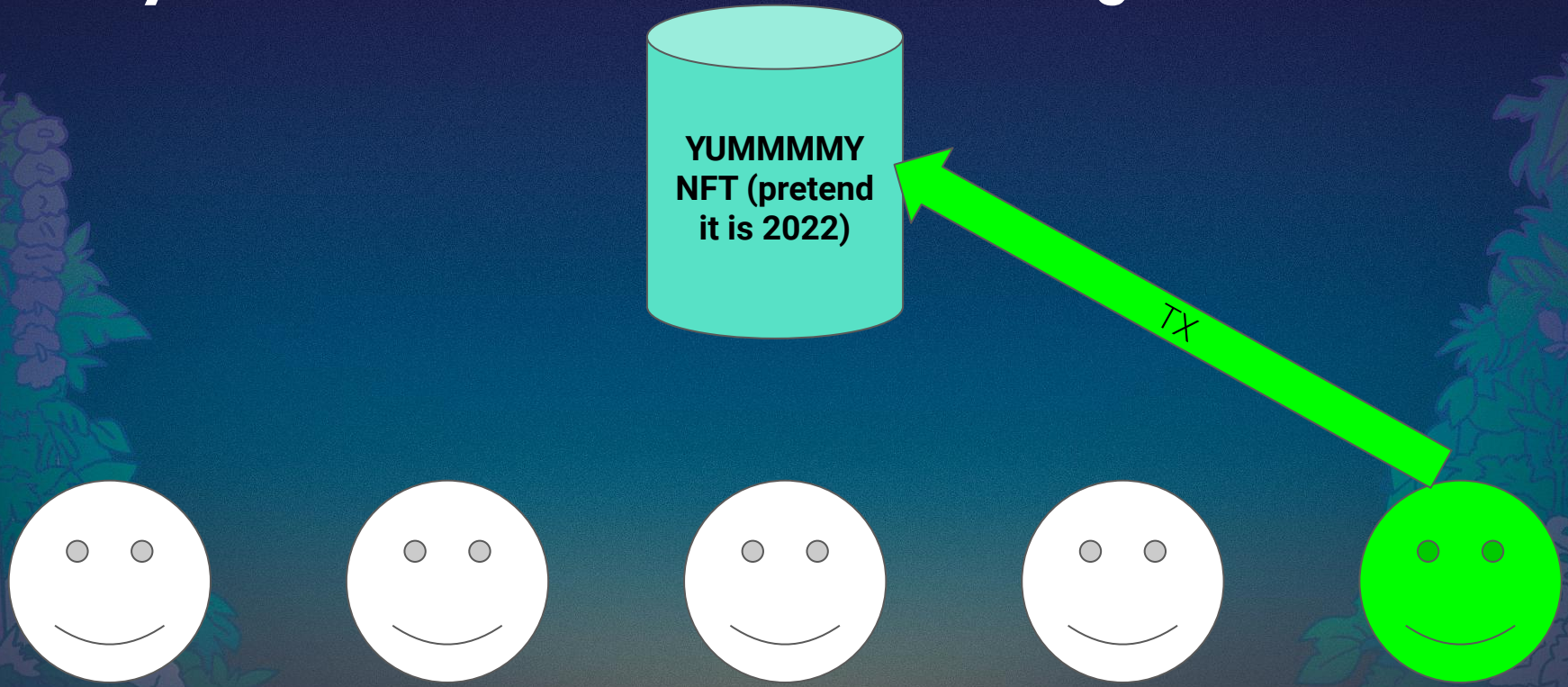
Example: NFT Sale at Midnight, no Revert Protection
OH NO THERE'S ONLY 1 WINNER. LOSERS PAY GAS!



Example: NFT Sale at Midnight, Revert Protection
Before block is validated



Example: NFT Sale at Midnight, Revert Protection
Only 1 winner, other transactions don't get included



Intents on L2s are broken without Revert Protection because it means filling the Intents are contentious and you will LOSE MONEY if someone else fulfills the Intent.

But wait, what about decentralized sequencing for L2?

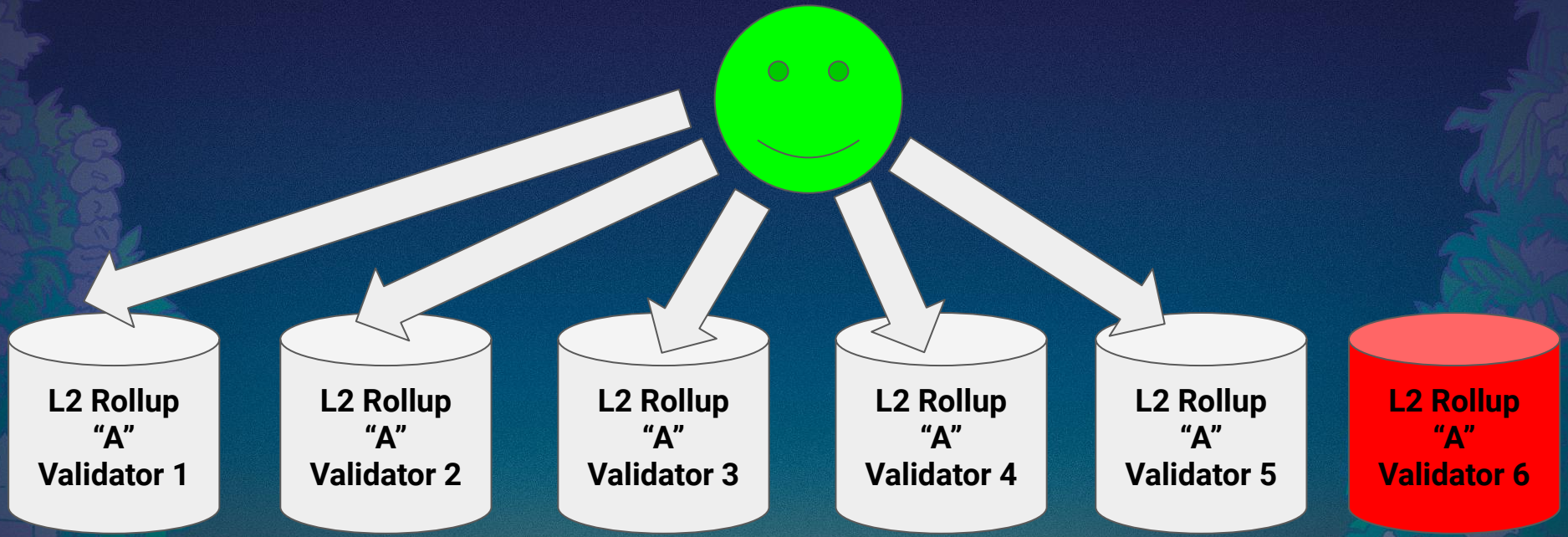
Decentralized Sequencing: Sequencer/Validator Choice

Choice in Sequencer. Prior example assumed single sequencer for an L2. Let the user choose.

User can specify which sequencer/validator they are willing to use on the L2.

- This can exist as a contract which specifies a whitelist/blacklist of sequencers/validators, users can outsource their selection to a list.
- If a sequencer includes a transaction which is blacklisted, their L2 block is treated as invalid and slashable.
- User choice brings the same kind of competition as L2 competition.
- No TEE, no fancy multi-step commit+reveal algorithm, simple design.

Ethereum L2: Validator Choice



Important Note: This design absolutely is not safe for implementing in L1, as having a large number of validators which frequently change results in significant centralization.

MEV is poised to dominate transaction costs for many L1 chains without L2s.

Ethereum is *already* well-positioned for mitigation against MEV due to prior and current hard work in L2 infra, new market exchange mechanisms, and wallet designs.

Ethereum's L2 work is at the forefront of the current crypto dialectic. Let's work towards a better world on-chain for everyone.


Thank you!
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