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[SUAVE Changelogs are evolving](#) to better represent all the moving parts being brought together with the Toliman release. Every three weeks, Stargazing will contextualise updates, fixes, or bugs within the wider frame of what SUAVE is and where we're going as a community.

We will also host [SUAVE Office Hours every third Thursday](#) to discuss Stargazing and to see demos of all the cool Suapps being built by different teams in the community.

This issue will be particularly unique, as it is an opportunity to summarise important work and research so that we all share common knowledge and a vision for where to go next.

The central question for our SUAVE community calls is simple: "How can we harness MEV to do useful work?"

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MEV the Measure

The work that started it all, [Flashboys 2.0](#), was formalised and extended in [Clockwork Finance](#) which states that: "our notion of MEV subsumes not only arbitrage but all attacks that can be carried out based on the current state of the system by a profit-seeking player

.”

MEV mostly

arises from people seeking to profit by ordering information in particular ways in specific periods of time. The way in which such profits can be taken vary greatly, and some seem more "extractive" than others.

Orders and ordering often raise questions about welfare, as seen by the use of words like "attacks", because profit-taking often results in less cooperative and/or coordinated use of public goods, information, and protocols.

That said, the truly useful part of the formal definition is that it presents MEV as a measure

: a more precise lens through which to assess the efficiency of our financial systems in the face of "all attacks". This will be an important part of the story we need in order to form a shared understanding of the phrase "useful work".

Nothing New

Questions of order are as old as any kind of exchange, due to what we generally call "slack". Slack is caused by two related, but distinct, features of trade: different time preferences/risk tolerance; and information asymmetry. Both create opportunities to move costs onto those more "willing" to bear them.

For our purposes, information asymmetry seems more amenable to technological fixes. Faster blocks, enshrined rules, account abstracted intents, etc., might help reduce the irony in a phrase like "move costs onto those more willing to bearing them" because users could express more accurately what costs they're actually willing to bear and/or rely on the protocol to protect some notion of "best execution" for them.

Ethereum is "[game-changing technology](#)" and we can do a lot to warp the games we play such that they more explicitly incentivise cooperative strategies. Reducing [strategic and informational uncertainty](#) is likely the best way to do this.

We know that using [commitments](#) in clever ways can get us a lot closer to [strategy-proof computing](#): that is, to developing shared environments in which there is [a meaningful capacity to harness profit-seeking behaviour](#) of any kind

and direct it towards useful work.

Layer 0: We, The People

However, MEV is not purely a technological issue, because it is also a result of the people

who use Ethereum and how we do so: specifically, our time preferences and risk tolerances. Trying to engineer a "solution" for psychological differences like these seems misguided at best and tyrannical at worst.

The psychological and cultural games in which we all participate are warped in more durable ways by narrative. To

paraphrase the [persona William Rookwood](#): “We already have all the information, what we want—what we really need—is a story.”

Working Story

What does it mean to take a profit? That depends on your time preferences. Who should pay the costs associated with trade? That depends on how you see [information, money, and politics](#).

What does it mean to do “useful work”?

Some [researchers use a physical analogy](#) to approach this question, because the term “MeV” also means “Mega electron-volt” (which is a measure of energy).

In this story, MEV can be imagined as the “latent thermodynamic financial energy of a system” and mechanisms are like engines, which take the output of some process and turn it into work to power another process (thereby earning the adjective “useful”). In this light, we can see that:

MEV is a measure

of the energy associated with the fact that there is any order at all

A common error is to focus on semantic order: the exact sequence of transactions in a block. However, our story recognises the devil in the detail and avoids asking, “what is the right

order?”

We’re really asking: how can we tune our engines to harness ALL of the energy available?

Combustion is analogous to the process of searching through possible orderings. Privacy is how we contain and direct the results of searching towards useful work. The specific work we want our engine to do is: (i) align user outcomes and (ii) ensure chain security, both under conditions of economic conflict.

SUAVE

[SUAVE is more](#) than one product.

SUAVE is the way we harness all the financial energy available through a [permissionless marketplace of mechanisms](#), which can be meaningfully measured in terms of how much energy they harness and the effect the resulting work has on aligning user outcomes and preserving chain security under economic conflict.

[SUAVE is the community](#) who have realised that MEV is a measure of the financial energy associated with the fact that there exist many possible orders at any given time in the total universe of transactions.

A Whole Star System

There are many moving pieces in the ever-changing [SUAVE](#).

Toliman

The [latest Toliman release](#) represents what we think co-processors will look like. All of the infrastructure required runs in TEEs and - at least in principle - can be run by anyone. Co-processors benefit from the fact that SUAVE has both public and private state, so you can use verifiable and public logic to compute in a secure and privacy-preserving way.

Bring Your Own Web2

[Using TEEs enables a host of web2 applications to begin enjoying the composability of “web3”](#) ([slides](#)). One example of this can be found at [teleport.best](#). We expect this pattern to become much more prominent in the near future. We’re also working [TEE-boost](#) to improve the guarantees current relays can make.

Suapps

The community has been creating awesome Suapps, with [use cases](#) ranging from [dark pools](#) to [extra data auctions](#) to [games](#), to [account abstraction](#), to [multichain NFTs](#) and [generalised interactions](#).

Meanwhile, we have open-sourced [builder](#) and have implemented both [smart multiplexing](#) and [gas refunds](#) for builders on

mainnet. We also have a workstream implementing the modular functionality required [to sequence L2 blocks](#), in addition to building L1 blocks. The aim is for all this to become a unified suite of software, run as a binary in a TEE, with any (or all) of its modules active depending on your requirements.

Deep Space Explorations

Suapps can get even more granular: you could create a [Bottom of Block](#) only [builder](#) which leverages some of the pieces described above. Or you can use different pieces to craft totally new mechanisms, like [Kettle Cash](#).

Kettle Cash highlights another star in SUAVE's system: Andromeda. This workstream encompasses all things TEE: from [reproducible builds](#), to [confidential compute infra](#) for the [EVM](#), to the [REVM](#), to [particular smart contracts](#) that leverage the unique features of TEEs in tandem with the public and private state that is a core feature of SUAVE. There are many repos to keep up with in this workstream, so the best way to learn about everything is first to join the [ongoing Flashwares sessions](#).

Interstellar Travel

We'll be covering updates like this as we ship them - with less narrative [every three weeks from now on](#).

We look forward to iterating on, improving, and ultimately evolving the vision of a SUAVE community who cares about, and who—working together—are capable of harnessing ALL the financial energy we can from shared systems, even when our individual economic interests seem to be at odds.