

Revisiting the Application Layer

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General-purpose blockchains store state and provide logic over that state. We usually refer to state as assets and logic as applications

. For example, Ethereum stores assets like Ether and Dai (state), which can be used in applications like Uniswap and Aave (logic). Collectively, state and logic make up what we call the application layer

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The cryptoeconomy began in 2009 with the launch of Bitcoin. Bitcoin is a minimal blockchain. Its limited state, inflexible logic, and low-performance infrastructure restricted its applications.

Then came Ethereum, which introduced a flexible logic layer via a new blockchain-native VM. It also allowed anyone to create their own crypto asset on the same network. Ethereum thereby expanded both the state and logic layers.

However, its infrastructure remained limited. Since the network's inception in 2015, much of its research community's focus has been on improving its infrastructure to support the application layer. Rollups and Danksharding improve throughput. Account Abstraction augments UX. MEV infrastructure can provide better price execution. Yet after 8 years, many are underwhelmed with what we have built on the application layer. Sure, we can trade our \$AAVE on Uniswap and can lend out our \$UNI on Aave. But where is the real, exogenous demand? Where are the use cases?

To-date, blockchains have been heavily reflexive. The cryptoeconomy is isolated from the real-world, and has limited demand beyond speculation. Past bull markets, like the 2020–2021 DeFi boom, were driven by speculation. An explosion of new crypto-native tokens and protocols triggered a reflexive upswing — speculation drove activity, driving more speculation.

Predictably, this cycle did not last. Eventually, the party must end, and positive reflexivity became negative reflexivity. Speculation was mistaken for product-market fit, and the search for real use cases remained. 2 years later, many are still searching for ways to scale on-chain activity. To understand how to grow the application layer, we need to examine it more closely.

Breaking Down the Application Layer

The application layer has 2 components: state and logic. State is the data; logic is the computation. Both state and logic can either be on-chain or off-chain. This gives us a 2x2 grid:

Each quadrant has different applications. Most blockchain applications so far have been in quadrant 1; we use crypto-native assets in on-chain protocols. Quadrant 2 involves bringing real-world assets on-chain and using them in protocols. Quadrant 3 covers cases where we use crypto-native assets off-chain. Everything else falls into quadrant 4. If neither the state nor the logic is on-chain, then it's not a blockchain application.

The use cases for blockchains are found in the first 3 quadrants.

Quadrant 1: Fully On-chain Economy

The fully on-chain economy encompasses crypto-native applications. Most current on-chain activity falls into this quadrant. These endogenous applications are inherently reflexive, which is one reason why crypto markets are so volatile and speculative.

On the positive side, this speculation has incentivized users and developers to enter the cryptoeconomy. Moreover, even though these applications are circular, they do contain some real value.

Speculating and gambling, though contentious, are real use cases. Nonetheless, we all want the cryptoeconomy to serve as more than just an [online casino](#). Peer-to-peer payments can also be done with crypto-native assets, but are less [stable and scalable](#).

To grow beyond speculation and inefficient financial services, we need to move past the first quadrant.

Quadrant 2: Programmable Finance

Another class of blockchain applications are unlocked by bringing real-world assets (RWAs) on-chain. These assets can benefit from global, programmable, and composable crypto markets. Those who question the value of crypto-native assets often sympathize with this quadrant, as summarized by the “blockchain, not crypto” mantra or the “tokenization” meme.

We call this quadrant programmable finance

. It involves developers introducing bonds, equities, commodities, or other traditional financial instruments to programmable markets, unlocking more accessibility, expressivity, and efficiency.

The most successful RWA so far has been centralized stablecoins. Stablecoins provide global, affordable access to US dollars and have consistently been described as the “[killer app](#)” for crypto. USDC and USDT already have a combined [market cap](#) of 114B.

Programmable finance has been discussed extensively elsewhere. These skeuomorphic applications have captured institutional interest in blockchain technology and will be a major driver of their growth. But we believe they are just one part of a much richer cryptoeconomy.

Quadrant 3: Off-Chain Applications

The last class of applications are those with on-chain state and off-chain logic. These digitally-native assets with off-chain applications are the most overlooked category of crypto.

The simplest examples are social assets

. In the last NFT craze, many NFTs were used as status or signaling items. Bored Apes, Punks, and other name-brand NFTs allowed their owners to flaunt their status or signal themselves as part of an exclusive community. The challenge with those NFTs was that their social value was heavily correlated with their price and novelty, which quickly eroded. Fortunately, this flaw was a characteristic of those NFTs rather than an inexorable property of all social assets. A more mature cryptoeconomy will provide more robust social assets.

The off-chain logic of social assets is how we behave off-chain, given what information is stored on-chain. In this way, social assets are coordination tools. Since everyone collectively agrees on the state of the Ethereum blockchain, we can orient our actions in the real-world around this [intersubjective truth](#). For example, we can use social assets to provide access to physical events like concerts or to prove one’s membership in a community like [Zuzalu](#). The value of storing these social assets on a blockchain instead of a centralized database depends on specifics, but it may benefit from a blockchain’s credible neutrality, sovereignty, permanence, censorship-resistance, financialization, or interoperability with the rest of the cryptoeconomy.

Applications in quadrant 3 can also provide digital benefits. Consider gaming. Traditional games can support some on-chain state while keeping much of the gaming logic off-chain. These assets then have exogenous demand either through their [in-game utility](#) or in their [cosmetic or social value](#).

Digital token-gating unlocks further use cases. [Friend.tech](#), though flawed, was directionally successful in demonstrating new possibilities at the intersection of social assets and token-gating. We suspect many exciting applications can be built in this category. Another recent example is [Orb Land](#). Orbs are NFTs that provide exclusive access to certain celebrities. Owning the orb grants the right to ask the respective celebrity a question at a certain cadence, such as every 7 days. As an additional flair, the orb market is a [radical market](#) that permits anyone to buy any orb from another person for a set price at any time.

Decentralized physical infrastructure (dePIN) projects are also in quadrant 3. These tokens incentivize real world activity like [mapping roads](#) or [installing hotspots](#), thereby solving the cold-start problem.

Growing The Application Layer

Not everything falls neatly into just one of these quadrants. Every application, to some extent, has an exogenous purpose. Tautologically, there must be some

real-world use case — some “off-chain logic” — in order for something to be useful. And in practice, most applications’ logic is partly on-chain, partly off-chain. Still, as a mental model, we find this framework helpful for reasoning about the application layer.

Following the latest developments in the ecosystem, we’ve formed 2 contrarian views on how to grow the application layer.

Our 1st contrarian view is that on the current margin, asset innovation is more important than application innovation. Yes,

we need better decentralized exchanges. But more importantly, we need to create assets that are actually worth exchanging

. The latter is the more tractable path to sustainably scaling on-chain activity. We encourage more teams to bring novel assets on-chain.

Our 2nd contrarian view is that in the short-to-medium term, quadrant 3 is more important than quadrant 2. RWAs have a promising future in the cryptoeconomy. But, for now, we believe bringing crypto-native assets to the real world is more important than bringing RWAs on-chain

. The former are their own type of “real-world asset”, and have a more unexplored, unrestricted design space.

Ending The Reflexive Era

As quadrants 2 and 3 make up a larger and larger fraction of the cryptoeconomy, the market’s reflexivity will decrease. Once we have exogenous demand for crypto assets and protocols, quadrant 1 becomes less circular. Suddenly Uniswap isn’t just an engine for facilitating speculation, it’s a decentralized business with relatively stable demand.

Real-world use cases dampen the reflexivity of the cryptoeconomy. Over time, the market will become more acausal. By “acausal”, we mean that the demand for blockchain applications does not come from a cause endogenous to the blockchain itself — we use it as the closest antonym to “reflexive” that we could find.

The end state of the application layer is far less reflexive than it is today, and will generate massive real world value. We’ll get there, slowly.

In the meantime, our team will be working hands-on with founders building the infrastructure for the future cryptoeconomy. If you’re one of them, [we’d love to chat](#).

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