Revisiting the World Computer

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It's time to revisit the World Computer thesis in Crypto. How is decentralized coordination via Crypto's World Computer holding up?

Decentralized coordination is the answer to coordinating creation and sharing of value with the internet itself. At first, *Bitcoin and purpose-built blockchains* fundamentally shifted the coordination paradigm for money and value through its initial use as p2p payment. Later, *Ethereum* expanded the scope of money and value with generalized Smart Contract blockchains and particularly the idea that a blockchain can be a *World Computer*: a global shared mainframe on top of which applications can be built, enabling those applications and the users participating in them to seamlessly interact without needing to agree on a shared actor that everyone trusts.

With blockchain, coordination moves beyond what is human-enforceable and into programmatically enforceable commitments embeddable into code. Blockchain autonomous systems, built and run as provable code, make enforceable commitments based on predetermined rules and consensus mechanisms. For the first time we can move beyond trusting people to do good, and relying on *ex-post-facto* recourse at gunpoint, to systems that behave exactly as built.

What are the real-world benefits?

- Digital money and value are *inside* the coordination system. Now everyone participating can be part of the valuation creation cycle.
- Developers can build in digital property rights with guaranteed code execution and immutable.
- Users get ownership of their non-siloed data and identities.
- Users benefit from applications without platform capture risk: API access and users' data and identity are held accountable to their code.
- Users get global access to financial primitives previously unavailable. This architecture, which gave rise to early DeFi applications, enables new forms of value coordination previously considered impossible.

This World Computer and its decentralized coordination is why we are all here today.

Despite the vast number of blockchain applications live today, we've only scratched the surface. What we can imagine and build is limited primarily by the scale of current blockchain architectures. Within the current capability envelope, speculative ventures like memecoins have thrived, offering entertainment and serving as a creative outlet while the underlying technology matures. These projects made sense in their time, but now we're approaching a tipping point. Advances in monolithic and modular blockchain approaches will soon provide abundant and ever cheaper

blockspace, data, and compute. Greater abundance always leads to induced demand, new better uses of more for less. When the abundance is a revolution, not merely an evolution, we even see paradigm shifts. Comparables include harnessing fire, planned agriculture, steam engine, internet communication, social networking, and now blockchains and AI. It's time to step back and unleash our collective imagination with a refocus on pushing the trustless, permissionless, censor-resistant post-tipping-point of World Computer, after we've crossed the tipping point of scalability and abundance. Assume the World Computer can handle what you imagine, we're arriving there now.

Let's build a future where collaboration is not constrained by the limitations of trust but is empowered by decentralized and trustless systems.

The Human Maxima

Before Blockchain and the World Computer, we reached a plateau where computers allow people to interact with one another but provide no means to enforce commitments. Consequently, coordination is limited by trust in central intermediaries, relationship-building, and constraints to collective decision-making.

- Trust remains localized and fragile. True borderless trust—with anyone, anywhere—cannot be achieved without mechanisms to guarantee commitments between parties who may not know or trust each other beforehand.
- Relationship-building is constrained to directing trust toward familiar networks or relying on intermediaries to validate interactions.
- Without decentralized commitments, relationships that rely on contractual or cooperative trust fail to scale beyond close, pre-existing ties.
- Collective decision-making, particularly in decentralized or distributed contexts, is stifled by the need for trust among participants.

This centralization reflects inherent human coordination failures, as described in Scott Alexander's "Meditations on Moloch[1]", where individual rational actions driven by self-interest lead to collectively suboptimal outcomes, harming society in the long term. The result is the emergence of centralized data silos and monopolies. Individual actors—developers seeking users, companies aiming for profits, users choosing convenience—made rational choices that had unintended global consequences. Companies like Google, Facebook, and Amazon.

Table 1: Facebook's News Algorithm

Scenario	Reality	Moloch Manifestation
To maximize user engagement, Facebook's algorithm prioritizes content that elicits strong emotional responses. This often means that sensationalist or polarizing content gets more visibility.	While this approach increases time spent on the platform (benefiting Facebook's ad revenue), it can lead to the spread of misinformation, echo chambers, and increased societal polarization.	Facebook acts in its own best interest to maximize engagement metrics, but the collective outcome is a more divided society with degraded public discourse.

[1]Moloch is the Web3 representation of a demon who destroys coordination. In a sense, the meta-mission of crypto is to defeat Moloch.

Table 2: Facebook & Third-Party Developers

Scenario	Reality	Moloch Manifestation
In the late 2000s, Facebook opened its platform to third-party developers, allowing them to build games and applications that integrated with Facebook's social feature Comnies such as Zynga thrived, creating popular games like FarmVille that leveraged Facebook's vast user base and social connectivity.	Over time, Facebook changed its policies, limiting developers' access to user data and altering algorithms that affected app visibility. These unilateral changes severely impacted developers who relied on Facebook's platform, leading to declines in user engagement and revenue. Zynga and others were forced to pivot their business models or saw significant losses.	Facebook, acting in its own interest to control user experience and monetize its platform, made decisions that adversely affected the broader developer ecosystem. This centralization of control stifled innovation and reduced the diversity of applications available to users.

Table 3: Google's Search Dominance

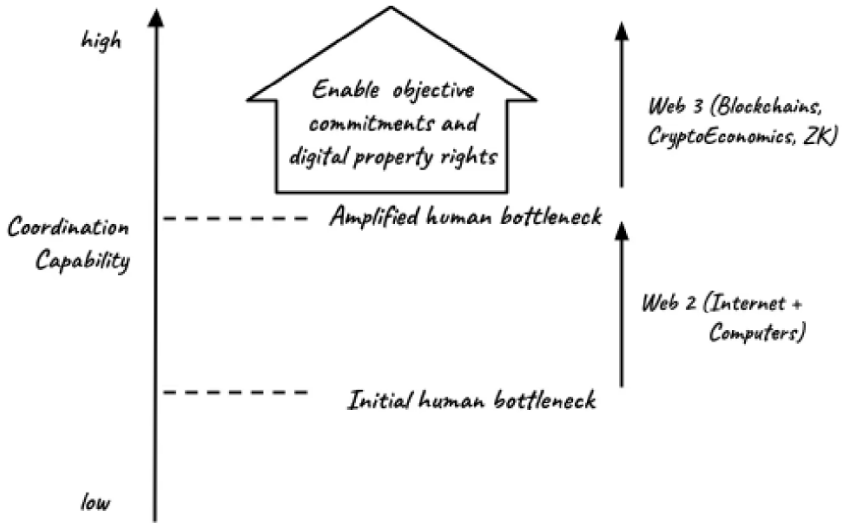
Scenario	Reality	Moloch Manifestation
Google's control over search results affects the visibility of information and businesses online. Its algorithms determine which websites get traffic, impacting the success or failure of companies.	Smaller businesses struggle to compete with larger ones that can afford Search Engine Optimization (SEO) strategies or paid placements. Moreover, Google's own services are often prioritized, potentially stifling competition.	Google's pursuit of optimizing search results for profit leads to a less competitive market and reduces diversity in available information, which can harm consumer choice and innovation.

Although the internet began as a democratized platform, without crypto solving the coordination challenges, we've instead encountered barriers to entry, suppressed innovation, and dependence on centralized entities. We've reached the human maxima of the internet and computers.

Crypto Is the Final Frontier of Human Coordination

Crypto represents the final frontier of human coordination.The World Computer enables internet-native property rights, fundamentally changing how data and digital assets are owned and controlled. In 2009, *Bitcoin* introduced a decentralized digital currency operating without central authorities, where code became law, establishing a transparent, unbreakable social contract enforced by a globally distributed system. In 2015, *Ethereum* brought smart contracts and a Turing-complete blockchain, allowing users to create their own application rules. This laid the groundwork for a "World Computer", enabling decentralized computation and applications with near incorruptible information flows.

Turing-complete blockchains represent a fundamental shift in digital interaction, not just amplifying human capability but transforming coordination itself. Blockchain embeds trust into the infrastructure, eliminating intermediaries and enabling trustless, objective commitments. Moving trust to decentralized protocols and code as law is perhaps the greatest leap in human coordination, pushing us beyond previous limits.



In this world computer, users retain ownership and governance over their data through cryptographic keys, providing direct control without reliance on centralized platforms. Developers build applications without dealing with data silos imposed by tech giants, fostering an open and innovative ecosystem.

Blockchain's World Computer allows us to overcome Moloch by facilitating a shift from centrally owned technologies to collective societal assets, a digital commons. This system operates transparently and reliably, upholding collective interests without producing incorrect or inconsistent results. Mirroring an ideal government that diligently implements the people's will through code, such a shared computing platform unlocks new coordination possibilities, aligns individual incentives with collective well-being, and fulfills the unfulfilled promises of the digital age.

The issues that faced Zynga—where dependence on platforms like Facebook made them vulnerable to policy changes and central control—becomes easily preventable. Users and developers operate on a level playing field, with transparent rules enforced by the blockchain, ensuring that the World Computer serves the collective interest rather than individual corporate agendas. Instead of minimizing a slippery slope, blockchains prevent it entirely. By changing the foundational structures of coordination, blockchain has the potential to address long standing societal challenges related to trust, transparency, and equitable access to resources.

All Talk, No Walk

Despite past attempts, these ideas haven't materialized significantly. The ICO era of 2017-2018 saw the rise and fall of concepts like decentralized versions of Airbnb and Uber; DeFi Summer

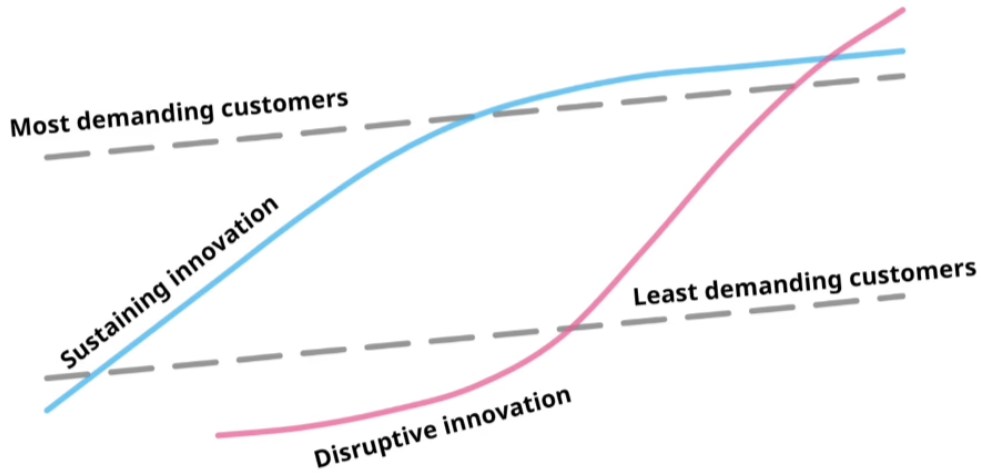
started in 2020 with Compound, MakerDAO, Synthetix; and the 2021 cycle featured initiatives like Regenerative Finance, Metaverses and DAOs. *However, none barring DeFi found meaningful adoption, primarily due to traditional blockchain performance limitations.*

Ethereum, despite pioneering smart contracts, self-limited to 15 transactions per second to maintain strong decentralization through wide hardware participation. With this tradeoff came congestion and high fees, which dwarfed adoption and innovation. Users faced slow confirmations and volatile costs, deterring mainstream adoption. Developers struggled to build competitive applications due to performance and usability constraints. Mainstream adoption remained a pipe dream. In spite of the progress seen in stablecoins and DeFi, the incarnation of a World Computer was only just starting.

However, recent technological breakthroughs are dramatically changing this landscape.

The Time Is Now

Technological advancements in both monolithic and modular scalability frameworks are creating an ideal environment with abundance, allowing non-financial applications to emerge.



This graph illustrates the development paths of incumbent and new technologies based on the Innovator's Dilemma thesis, which explains how technology disruptions occur. Disruptive innovations typically begin by targeting niche markets, iterating quickly with small successes and failures to achieve product-market fit. Once established, they rapidly scale, improving cost, performance, and features, ultimately reaching a tipping point where the broader market shifts to the new technology.

Disruptive technologies often create induced demand, where improvements in performance, features, and cost fuel faster growth than the corresponding reduction in costs per unit. This contrasts with sustaining innovations, which evolve more slowly in response to established markets but struggle to decrease costs and increase demand without undermining existing revenues.

In blockchain, the early niche market users demanded sovereignty of assets, and a trustless

World Computer as opposed to a trusted middleman. Early applications seized their capacity and costs based on the early World Computer with devout users willing to accommodate limited UX and features. As we see the fruits of development over multiple crypto cycles resulting in massive capacity improvements and cost reductions, those core values are expanding to fit a much broader set of end-user applications.

We are now seeing real-world instances of the Innovator's dilemma in action, with an inflection point approaching. Innovations like Jump's Firedancer client and its optimizations are pushing performance boundaries, with potential throughput of 1 million transactions per second. Modular approaches, pioneered by teams like MegaETH and EigenLayer, enhance Ethereum's capabilities in execution and data availability while adding verifiability.

Truly abundant blockspace alongside enhanced performance will blast open the doors for Autonomous Worlds, DePin, User Owned Social and Open Finance.

The Ideal World Computer

A World Computer is a single, composable, open, and permissionless state machine that can host programs with minimal trust. This definition has two aspects: functionalities, i.e., the interface and services provided to users; and guarantees, i.e., promises of its behavior made to users and achieved with proper system designs.

The key feature that distinguishes a World Computer from a personal computer (e.g., a smartphone) is its communal nature. The platform should allow many users to concurrently invoke programs and inspect its storage, resembling time-sharing mainframes in the early days of computing. We also expect that a successful platform will provide a common, easy to understand programming interface, i.e., a *lingua franca*, to maximize adoption and forward compatibility.

Perhaps more distinguishing are the strong guarantees that a World Computer will provide.

- *Correctness.* Human coordination depends on fair enforcement of settled rules. Otherwise, coordination degenerates into exploitations such as thefts, frauds, and bank runs. In a World Computer, programs (smart contracts) are the rules, and the computer will always enforce the rules fairly by executing the programs correctly.
- *Built-in openness.* The open internet of the early days degenerated into silos and islands, a tempting but suboptimal local maxima. Guarantee of open access—reads and writes from individual users, and exchanges between programs—must be built into the system lest we recreate the corporate controlled internet.
- *Responsiveness.* The system must respond to human interactions with negligible delays. Humans, equipped with computers, are actuators with immense speed. A successful coordinator must not bottleneck its users (humans and their computers) with lengthy feedback loops.
- *Capacity to fit the world.* A true World Computer shines the most when it has th capacity to onboard an entire society. This means space to store the world's data, speed to execute the world's coordination logics, and reach to the world's population.

To balance and achieve all four of these guarantees, the World Computer developed a common framework of hierarchy. In Ethereum, Layer 1 provides correctness and built-in openness and Layer 2s achieve responsiveness and capacity. Other chains like Solana have also recently started adding hierarchy via network extensions, with similar aims.

PMF^2 / What Can We Use the World Computer For?

Certain decentralized applications, namely DeFi, Stablecoins and DePin, have already demonstrated clear product-market fit despite the scaling constraints blockchains face today. Yet on the World Computer we describe, these are a subset of applications which are inherently superior when living on a global state machine. We describe this as PMF^2.

DeFi on such a World Computer will render centralized exchanges (CEXs) obsolete, bringing users on chain enmasse for the very first time. CEX's act as single point of failure custodians that contradict the ethos of crypto. Real-time trading, high liquidity, and advance features become feasible without intermediaries, reducing reliance on vulnerabl centralized entities and aligning with crypto's original principles. For the first time, DeFi platforms will match or surpass the speed and user experience of CEXs while allowing users to retain control over their assets.

This high-performance World Computer will make stablecoin use cases practical for the first time. Near-instant, low-fee transactions make stablecoins practical for everyday use—remittances, microtransactions, and commerce—challenging traditional payment processors. Efficient on-ramps allow easy conversion between fiat and stablecoins, lowering barriers to entry and integrating cryptocurrencies into daily life. This advancement supports programmable money and automated services, embedding stablecoins deeper into the global economy.

The World Computer facilitates real-time data processing and coordination among numerous devices, making decentralized infrastructure viable and competitive with centralized alternatives. DePIN use cases such as, on-chain Uber, decentralized VPNs, content delivery networks, and energy grid platforms become attainable with high throughput and low latency. These applications reduce costs, increase fairness, and eliminate reliance on central authorities, fostering innovation and user empowerment.

By delivering performance and user experiences on par with Web2 applications—and offering advantages like enhanced security, privacy, and user sovereignty—blockchain-based applications will *surpass and displace* centralized platforms. These equitable business models will lead to significant user migration seeking better services and fairer ecosystems, with guaranteed market competitiveness leading to optimal consumer choice.

Non-financial applications are the crucial moment for widespread blockchain adoption because they focus on people's relationships, personal growth, and the activities they love— centered around emotional value over financial gain. These applications struggle in crypto because limited blockspace, low throughput, and high latency make storing and processing non-financial data impractical and costly. With the advent of *abundant blockspace*, we can now store and process non-financial data on-chain efficiently and affordably. This makes it possible to create comprehensive knowledge graphs—decentralized networks mapping relationships and interactions across various entities—that require extensive data storage and frequent updates. Abundant blockspace accommodates this without prohibitive costs, eliminating data silos and empowering developers with open APIs, fostering innovation and collaboration.The social graphs, only possible through abundant blockspace, provide the foundation for breakout applications to be built on top of it. By tapping into what people truly value—relationships, creativity, and personal growth—abundant blockspace enables blockchain technology to achieve widespread adoption. This transformation reshapes how we connect, share, and collaborate, fulfilling the human desire for meaningful interaction and community.

Building for Tomorrow

We stand on the brink of a transformative era where technology can reshape societal coordination. The decentralized World Computer offers an opportunity to overcome coordination failures by embedding trust into code and enabling true digital property rights. This empowers individuals, fosters innovation, and promotes equitable access. Advancements in blockchain scalability means that with abundant blockspace, we can revolutionize finance through DeFi and stablecoins, enable decentralized infrastructure, and foster enriching non-financial applications.

Now is the time to build this trustless, permissionless, censor-resistant World Computer. By doing so, we address current limitations and fulfill the unfulfilled promises of the digital age. *Let's build a future where technology unifies us.* By aligning individual incentives with collective well-being, we can create an ecosystem where innovation thrives and opportunities are accessible to all. The next chapter of human coordination awaits. The World Computer isn't just a vision; it's a call to action.