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AI & Crypto: A Power Reshuffle or Resource Harvesting?

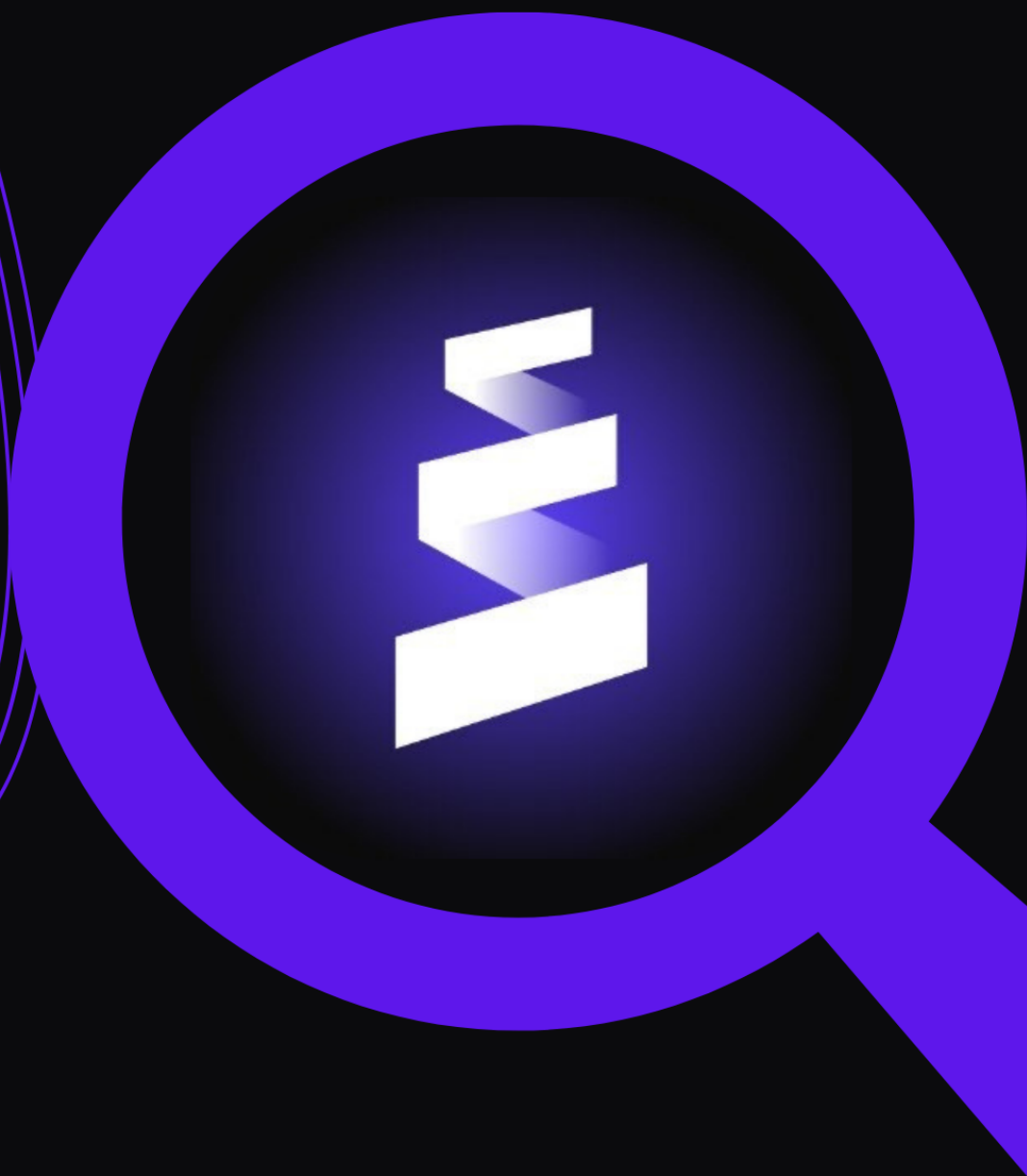


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Abstract

This paper examines the deep power struggles triggered by the convergence of artificial intelligence and blockchain technology. On the technical level, this convergence seeks to construct an open and trustworthy new infrastructure through decentralized physical infrastructure networks (DePIN), data assetization protocols, and payment and identity systems for autonomous agents. On the economic level, it accelerates the financialization and securitization of core productive resources such as computing power, driving a structural shift from asset ownership to service consumption.

However, this convergence is also accompanied by significant tensions in technical feasibility, risks of excessive financialization and speculative bubbles, and the potential re-centralization of governance power. Its long-term vision points toward an intelligent Internet-of-Things economy driven by autonomous agents, in which everything can be fractionalized. Yet the critical path toward this future is not purely a matter of technological breakthroughs, but rather a profound governance choice concerning the redistribution of power and interests: are we shaping a more open and democratic intelligent economic ecosystem, or merely constructing a more efficient set of digital tools that ultimately entrenches traditional capital's monopoly over the means of production?

Keywords: AI + Crypto, AI Agents, DePIN, Programmable Money, RWA

01 / The Year of the Singularity: Questioning Ownership Amid Accelerating Technology

Elon Musk stated bluntly on social media that “2026 is the year of the Singularity” [1], sparking widespread debate about the trajectory of technological and social development. In this vision, human society by 2026 may enter a state of near-weightless acceleration driven by technological returns. Tesla, described by Musk as a “computer on wheels,” embodies his strategy for confronting the singularity: for AGI to be truly effective, it must possess embodiment—the capacity to interact with the physical world. Whether through autonomous driving, humanoid robots such as Optimus, or SpaceX projects, the underlying objective is to construct physical carriers for the coming AGI era, integrating hardware and software to build an infrastructure capable of safely traversing the technological singularity.

A key sign of an approaching singularity is that AI capabilities are moving beyond closed test environments into open, complex real-world settings, demonstrating generalized problem-solving ability. DeepMind’s AlphaFold series, capable of autonomous scientific discovery, has used deep learning to solve fundamental problems in natural science that long resisted human efforts. By transforming research paradigms that once relied on massive trial-and-error and costly experiments into data- and algorithm-driven prediction systems, AI has dramatically expanded scientific productivity. Once AI itself can replace humans in scientific research and technological iteration, the feedback loop of technological progress will detach from the speed limits of human cognition and enter a self-accelerating trajectory dominated by machines.

The 2026–2030 window represents a critical period for buffering, guiding, and preparing for this profound disruption. The shock has already begun: capital is pouring aggressively into infrastructure, global regulators are scrambling to respond, and a pervasive cultural mood of excitement mixed with anxiety about the future is taking hold.

Against this backdrop, the convergence of Web3 and artificial intelligence is giving rise to new forms of infrastructure. AI agents have evolved from simple interaction interfaces into autonomous entities capable of invoking external APIs, making payments, and completing transactions. Programmable money protocols supporting their operation tightly integrate value transfer with programmatic logic. Meanwhile, the physical infrastructure underpinning computing power—GPU clusters, data centers, and robotic systems—is being tokenized through smart contracts, converting ownership or revenue rights into liquid on-chain financial assets. As Web3’s financial engineering capabilities are systematically applied to the securitization of computing power as a core means of production, a fundamental question becomes unavoidable: does this process build a more open and democratic economic architecture, or does it merely provide more efficient digital tools that ultimately reinforce traditional capital’s accumulation and control over productive resources? Blockchain technology, born from ideals of digital equality, is now deeply intervening in the allocation of physical resources in the real economy.

02 / Technological Convergence

2.1 Building Decentralized Economies of Compute, Data, and Models

AI development currently faces a central contradiction: the more powerful AI becomes, the more it is monopolized by a small number of technology giants that control massive datasets, top-tier computing power, and closed ecosystems. This centralized model not only discourages innovation but also raises widespread concerns over data privacy, algorithmic opacity, and unfair value distribution. The decentralized, verifiable, and tokenized principles advocated by Web3 attempt to offer a fundamentally new technical foundation for addressing these challenges. This convergence is not a vague conceptual overlay; it is unfolding through several concrete implementation paths.

The most direct application is the use of decentralized physical infrastructure networks (DePIN) in AI computing. Startups such as io.net [2] aggregate millions of idle high-performance GPUs worldwide through blockchain protocols, forming an on-demand decentralized compute cloud. Its core advantage lies in dramatically reducing costs—by as much as 70%. Renting an NVIDIA H100 GPU for AI training can cost as little as approximately USD 2.19 per hour on io.net, compared to around USD 12.29 per hour on AWS. A comparison is shown below:

Figure 1: Cost-effectiveness Analysis of Decentralized Computing Power

Compute Provider	GPU	Estimated Cost (USD/hour)	Notes
Traditional centralized cloud (AWS)	H100 PCIe	~12.29	Benchmark price, typically requires long-term contracts
Decentralized compute networks	H100 PCIe	~0.89 – 1.70	~82% – 93% cheaper than AWS, on-demand
Reference data	GPU cluster size	30,000+ GPUs	Aggregated network total as of Dec 2025

Source: io.net official website

At the data layer, convergence seeks to address both data silos and privacy dilemmas. Ocean Protocol [4], for example, builds a data marketplace whose key innovation lies in enabling data usage without exposing raw datasets. Data providers tokenize their data assets and define usage policies and pricing. Buyers do not receive data copies; instead, they obtain permission to send their AI models into secure execution environments (such as trusted execution environments, TEEs) where the data resides. After training, only the optimized model is extracted, while raw data remains untouched. Through cryptography and economic incentives, this model activates dormant data assets while preserving data sovereignty and privacy, supplying AI with more diverse and higher-quality fuel.

Beyond this, convergence is giving rise to a new class of economic actors: autonomous AI agents capable of independent transactions. This highlights foundational payment layers such as the x402 protocol. Consider an AI agent specialized in DeFi arbitrage, monitoring price discrepancies across decentralized exchanges. Upon detecting an opportunity, it must instantly call paid on-chain data

APIs, pay cross-chain bridge fees, and execute trades. With an embedded smart-contract wallet integrated with x402, the agent can complete the entire “request–pay–consume service” loop automatically within milliseconds. Stablecoins such as USDC become its native bloodstream, while smart contracts function as its automated charter.

This implies that future internet services may no longer primarily charge human users but instead directly serve autonomous, self-paying AI workers—forming a machine economy. Yet a machine economy with payment capability but no trust foundation is fragile and dangerous. While payment layers solve how value flows, they do not address whether a counterparty should be trusted. This is precisely the gap filled by ERC-8004. It provides each AI agent with a persistent, portable on-chain identity (represented as an ERC-721 NFT), transforming agents from anonymous, disposable code into accountable entities with continuity. On top of this identity, a verifiable reputation system records cryptographic feedback after each collaboration.

For example, an arbitrage AI not only transfers payments automatically via x402 but can preferentially select service providers with high ratings and clean histories in the ERC-8004 registry. After successful trades, it accumulates not only profits but also on-chain reputation scores visible to future partners. Payment and reputation thus form a closed loop: x402 automates value exchange, while ERC-8004 ensures that exchanges occur among trustworthy participants and continuously accumulate trust capital. Together, they establish an infrastructure for the machine economy that is not only efficient but reliable, enabling AI agents to collaborate based on historical performance and verified identity—unlocking the full potential of autonomous agent economies.

At the deepest level, convergence aims to build a protocol layer for decentralized artificial intelligence (DeAI). This is not merely about connecting resources, but about establishing new standards for AI development, evaluation, and value distribution. Bittensor ^[5], for example, functions as a collective intelligence market composed of decentralized machine-learning models. Thousands of specialized sub-models—some focused on summarization, others on code generation—compete and collaborate. Validators evaluate output quality, and the network rewards consistently high-value models with native tokens. Poor models are eliminated, while strong ones receive more resources. This game-theoretic optimization loop challenges the paradigm of single giant models monopolizing all tasks, replacing it with a market-driven, continuously evolving model ecosystem.

This path is not without obstacles. Decentralized networks still struggle to match centralized supercomputing clusters in coordinating complex AI training tasks. Privacy-preserving technologies such as zero-knowledge proofs introduce additional computational overhead. Poorly designed token economics can easily drift toward speculation rather than productive utility. Nonetheless, the convergence of Web3 and AI has moved beyond theory into concrete experimentation across compute markets, data trading, agent economies, and open protocols.

2.2 On-Chain Mapping of Physical Assets: RWA and Asset Tokenization

The on-chain mirroring of physical assets—real-world asset (RWA) tokenization—aims to convert valuable physical assets into freely tradable, divisible blockchain tokens through a combination of technology, legal structures, and financial engineering. For AI-era core resources such as GPU computing power, data centers, and robotics, this process is particularly critical. It transforms heavy, indivisible physical assets into flexible, composable financial instruments, attracting broader capital participation and improving capital efficiency across the ecosystem.

This mapping relies on hybrid on-chain/off-chain legal and technical frameworks. Off-chain, legal wrappers are essential. Asset owners (e.g., compute centers holding tens of thousands of GPUs)

place ownership or revenue rights into special purpose vehicles (SPVs) or trusts. These legal entities hold the physical assets and define precisely what on-chain tokens represent—ownership, usage rights, or revenue shares—ensuring legal enforceability and regulatory compliance. Oracles then bridge smart contracts with real-world operational data, such as energy consumption, GPU utilization, or robotic work logs, enabling automated revenue distribution and contract execution.

At the smart-contract level, token holder rights and asset operations are strictly defined. Cross-chain bridges enhance liquidity by enabling asset movement across blockchains. Zero-knowledge proofs serve dual roles: protecting sensitive operational data while generating verifiable proofs for on-chain settlement. Through this system, physical assets complete their on-chain mirroring. GPU clusters become baskets of globally tradable, cash-flow-generating digital assets, lowering investment barriers and providing new financing and exit paths.

03 / Economic Restructuring: From Ownership Economies to Access-Based Finance

AI-driven economic restructuring resembles a silent but fundamental tectonic shift. Rather than merely automating tools, AI standardizes and industrializes cognitive capabilities, reshaping value creation and distribution from the ground up.

3.1 Cost Structures Shift from Ownership to Access

Traditional enterprises rely on ownership—software licenses, servers, and full-time staff. AI erodes this model. Competitive advantage increasingly lies in accessing and composing the most powerful AI services with minimal energy and maximum efficiency. This battle centers on next-generation infrastructure, as illustrated by NVIDIA’s strategy: beyond selling chips, it aims to become the “Android of robotics” by offering open foundational models and full simulation toolchains. Control shifts from products to ecosystems and standards.

Meanwhile, AI infrastructure assets are being financialized through blockchain. Projects such as GAIB ^[8] package GPU servers, data centers, and future robotic revenues into tradable tokens, lowering entry barriers and channeling global liquidity into “digital-era power plants and railroads.”

3.2 Value Re-Aggregation Toward Infrastructure and Protocol Layers

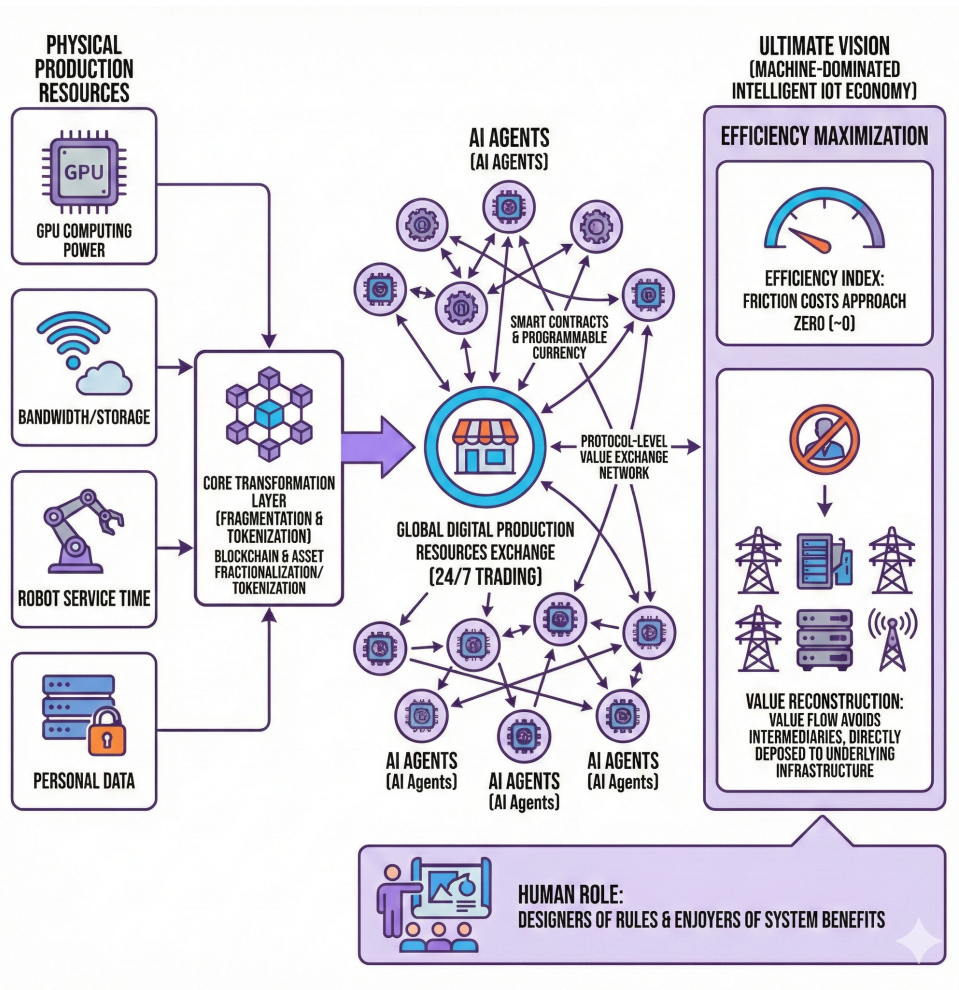
Value increasingly accrues to three groups: infrastructure providers, core protocol designers, and early ecosystem contributors. Pure application-layer platforms without control over infrastructure or standards face declining margins. Value distribution flattens, flowing directly to those controlling irreplaceable real resources.

04 / Ultimate Vision: An Autonomous Intelligent IoT Economy

In the foreseeable future, we may enter a highly financialized world where everything becomes fractionalized. Compute, bandwidth, storage, robotic labor, and personal data will be precisely measured, tokenized, and traded 24/7 in global markets. Idle GPUs, home bandwidth, or anonymized health data become monetizable assets. This creates an unprecedented global exchange for digital means of production—maximizing efficiency while deeply entangling individuals in financial volatility.

At its extreme, this evolution leads to a machine-driven intelligent IoT economy. Billions of AI agents become primary economic actors, autonomously coordinating via programmable money and smart contracts. Human roles shift from execution to rule design and value participation. Efficiency approaches theoretical limits—but value increasingly concentrates at foundational infrastructure layers. The diagram below illustrates the concept.

Figure 2: Autonomous AIoT Economy



Source: Pharos Research

05 / Challenges and Risks

At present, the primary challenges and risks are rooted in the very nature of this convergence: it attempts to use technologies that have not yet fully matured to reconstruct the most complex and sensitive foundations of the socio-economic system. These risks do not exist in isolation; rather, they are interwoven and mutually reinforcing, forming layered, systemic challenges.

First, at the level of technical feasibility, there exists a fundamental tension between decentralized paradigms and the high-performance requirements of AI. Current blockchain networks' transaction throughput, confirmation speed, and costs are insufficient to support the massive, high-frequency micro-transaction demands between AI agents. Moreover, AI training requires highly centralized, ultra-large-scale compute clusters to operate in tight coordination, whereas the decentralized scheduling advocated by blockchains often introduces significant efficiency losses and communication overhead when coordinating complex computational tasks. Technologies such as zero-knowledge proofs can address privacy verification, but generating the proofs themselves requires enormous computational resources, potentially resulting in a net loss. This means that in the AI core domains where performance is most critical, decentralized solutions may remain in an awkward state of being usable but not practical for a long time, making it difficult to challenge the dominance of centralized cloud services.

Second, economic models and financial risks are extremely pronounced and are highly likely to give rise to speculative bubbles and systemic fragility. Tokenizing means of production such as computing power and data is, in essence, the capitalization, pricing, and trading of uncertain future returns in the present. This easily leads to excessive financialization and speculative manias. For an AI computing-power project that has not yet generated stable cash flows, its token price may become completely detached from actual utility, driven instead by market sentiment and narrative hype, forming massive asset bubbles. Once market sentiment reverses or the project fails to deliver on its promises, cascading price collapses may follow. More importantly, while DeFi (decentralized finance) composability brings innovation, it also creates unprecedented systemic risks. An AI prediction-market treasury that appears independent may be nested within multiple underlying lending protocols; if any single link is attacked or malfunctions, risk can propagate across the entire ecosystem like falling dominoes, leading to instantaneous liquidity dry-ups and massive asset losses.

Third, the social and ethical impacts are exceptionally severe and may far outpace the development of the technology itself. The most immediate threat is a discontinuous restructuring of employment. The combination of AI and automation will not only replace factory assembly-line workers, but will also systematically displace large numbers of mid- to high-level white-collar cognitive jobs, such as analysts and programmers. The speed and scale of this displacement may far exceed the capacity of social retraining systems and welfare structures, resulting in large-scale structural unemployment and social instability. At the same time, when AI agents possess autonomous economic agency and control over resources, entirely new questions of responsibility and ethical dilemmas emerge. If an autonomously trading AI hedge fund were to trigger a market crash, who should bear responsibility—the developer, the owner, or the AI itself? Existing legal and ethical frameworks remain largely blank on these questions.

Finally, risks of governance failure and the re-centralization of power may return in new forms and may even be amplified. On the surface, Web3 pursues decentralization and democratization, but reality may move in the opposite direction. Control over computing power, data, and algorithmic models may give rise to new and more entrenched forms of centralized power. The massive capital

and computational resources required to train top-tier large models naturally favor monopoly by major players; meanwhile, blockchain networks themselves often exhibit tendencies toward the concentration of wealth and voting power in the hands of early participants and large token holders. More dangerously, when such technological power converges with geopolitics, it may evolve into digital hegemony. States or entities with advantages in AI and blockchain technologies may leverage them to establish unprecedented capabilities for social surveillance, automated opinion shaping, or even intelligent warfare, intensifying the global digital divide and strategic confrontation. In addition, while smart contracts that execute code absolutely bring certainty, they lack the flexibility and discretionary judgment inherent to human legal systems. Once code contains vulnerabilities or is maliciously designed, the consequences are irreversible and difficult to remedy—“code is law” may devolve into flaws or even tyranny.

Therefore, the path of this convergence is far from smooth. It is an adventure that navigates the tensions between technological efficiency, economic rationality, social equity, and human control. Its greatest paradox lies in the fact that efforts aimed at creating more open and equitable systems may inadvertently forge new, more concealed and more resilient chains. To harness this force requires not only technological breakthroughs, but also forward-looking governance wisdom, global cooperation, and a firm defense of human-centric values.

06 / Conclusion: From Technological Narratives to Governance Choices

The competitive dimensions of the industry have quietly undergone a fundamental shift, with the focus moving from early-stage technological novelty toward more essential factors such as reliability, governance capacity, and distribution capability. The hallmark of 2026 may not be a single earth-shattering technological breakthrough, but rather the maturation of a series of reliable, interoperable infrastructure components that are systematically reshaping the patterns of value circulation and global collaboration.

Building a global, highly liquid market for digital means of production will not only channel global capital more efficiently into the construction of next-generation infrastructure such as artificial intelligence, but will also give rise to a machine economy driven by autonomous agents and characterized by extremely low transaction friction. In this context, blockchain, as a neutral protocol layer, provides a verifiable and composable foundation for trust and coordination.

Beneath the grand narrative of the technological singularity, the power logic of the old world has not exited the stage; it has merely changed into new digital attire. While the on-chain securitization of physical assets enhances capital efficiency, it may also evolve into a sophisticated tool that digitally packages control over the means of production and accelerates its concentration in the hands of a small number of financial capital holders.

Therefore, what we are facing is far from a simple choice of technological pathways, but rather a profound core governance decision: are we using this technology to build a more open, democratic, and broadly shared intelligent economic foundation, or are we, inadvertently, forging a more efficient and more globalized digital lever to consolidate and reinforce traditional capital's monopoly over the core means of production in the new era?

The answer is neither predetermined nor something that technology itself can provide. The ultimate direction will depend on the technical designs we choose today, the institutional arrangements we adopt, and the value expectations to which human society ultimately anchors itself.

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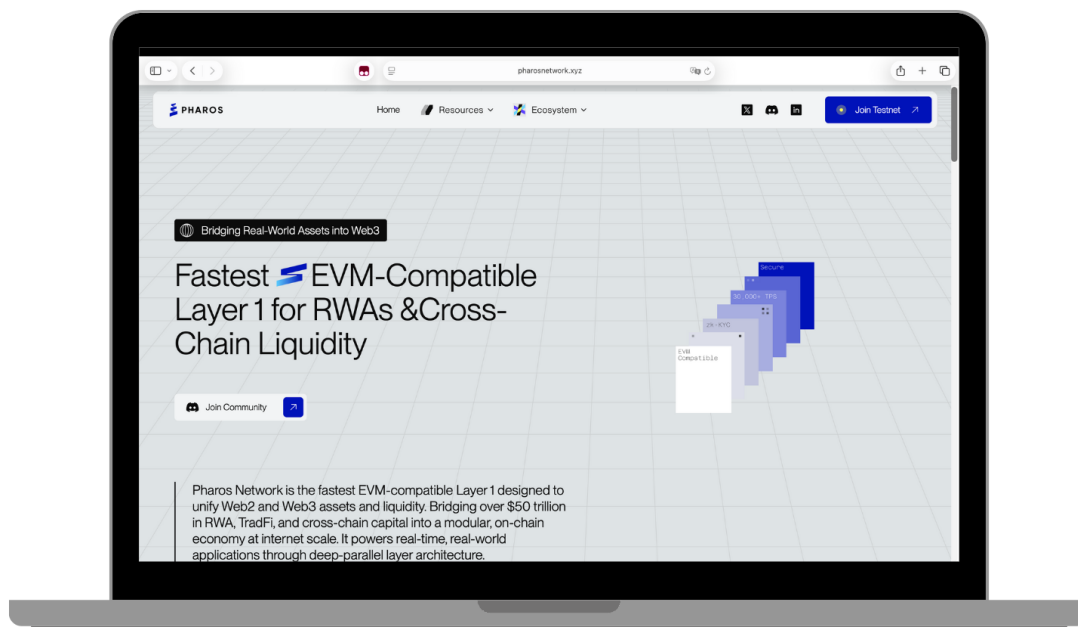
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