Bring PoW to Everything:

Extending Verifiable Real World Cost and Public History to New Issuance and the Redesign of Existing Assets

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Abstract

Bitcoin demonstrated that Proof of Work is not merely a consensus algorithm. It is a credit structure that binds public history to verifiable real world cost, allowing any participant to independently validate rules, validate history, and converge on a single settlement outcome. This reduces coordination friction in forming and maintaining value consensus and enables scalable double spending resistance in an open network. This litepaper argues that, despite more than a decade of experimentation, PoW did not naturally become a general credit layer for broader asset creation because most issuance methods can at best borrow timestamp-like properties of public history or reuse a PoW algorithm, but cannot make verifiable cost an intrinsic, inheritable property of an asset that persists through transfers and evolution. We propose HACD as a transferable unit of verifiable cost and introduce Hybrid Stack Token as the structural form that makes PoW value migration possible by attaching identity, state, and lifecycle events to public history. We then outline the HACD Stack Token Protocol and the HACD chain with Hacash Virtual Machine as the execution environment that brings these assets into composable application markets. The goal is to make PoW backed credible scarcity a default property at the asset layer, not an optional marketing label, and to apply it to both new issuance and the redesign of existing assets.

1 Introduction: the problem is not how fast assets can be created, but how trust can be maintained

Crypto has proven that assets can be created at near zero marginal cost. Token standards, inscription-like systems, and high throughput chains have made issuance cheap and fast. What remains less proven is whether assets can be maintained as credible objects across long time horizons, across teams, across market cycles, and across governance changes, while preserving auditability, accountability, and a shared record of facts.

Bitcoin offered a different answer from traditional credit expansion. It did not rely on institutional promises. It used Proof of Work to bind public history to verifiable cost, enabling open participation with low trust assumptions [1]. HACD Labs proposes to extend this credit structure beyond money into broader asset issuance and asset redesign, so that PoW is not only a tool for ledger security but a reusable foundation for asset credibility.

2 PoW beyond consensus: public history plus verifiable real world cost

Bitcoin's core invention is not simply that events are written to a chain. It is the mechanism by which a single public history emerges that anyone can validate and that is economically hard to rewrite [1]. Miners package transactions into blocks and link them by hashes. When forks occur, nodes follow the chain with the greatest cumulative work as the canonical public history. Public history answers three questions in a way that does not require a trusted institution: what happened, in what order, and which version is the accepted outcome.

PoW adds a crucial constraint to this history. Rewriting the past requires reproducing work and catching up with the network's ongoing accumulation of work, making attacks costly and increasingly unlikely as confirmations deepen [1]. PoW does not guarantee any price. What it guarantees is that the shared history and the scarcity rule are defended by verifiable cost. Markets do not buy electricity itself. They buy the security and rule credibility that electricity defends. PoW reduces the friction involved in coordinating consensus among participants, making it easier for value consensus to form and become more stable over time.

For assets, this matters because many systems can store records, but few can provide a record that is independently verifiable, globally consistent, and economically resistant to revision. Public history is not a background detail. It is a credit primitive.

3 Why PoW did not become a general credit layer for assets

When people attempt to extend PoW to broader asset creation, three paths recur: issuing assets on a PoW chain, anchoring assets into a PoW chain, or expanding PoW ecosystems via merged mining. These approaches typically borrow part of PoW's properties but do not create transferable, inheritable PoW credit at the asset level.

First, issuing smart contract assets on a PoW chain generally inherits public history but does not create a unit level linkage between verifiable cost and the asset itself. Scarcity is often a matter of promises, governance, and narrative rather than an externally verifiable cost anchor that is inseparable from the asset.

Second, merged mining often resembles creating a new PoW ledger and a new asset that must establish its own demand and credibility. Even in the best case, merged mining mostly reuses an already proven

PoW algorithm or parameter set, which reduces engineering uncertainty, but it does not reuse the demand, liquidity, and social consensus of an existing PoW asset [9]. A reused algorithm is not the same as migrated PoW credit.

Third, writing data into Bitcoin blocks or using inscription like systems typically leverages timestamp and audit properties of public history [8]. It can prove that some bytes were committed at a certain time, but it does not usually make verifiable cost a persistent, inheritable property of the asset through its lifecycle. In many cases, it is closer to paid attachment and traceability than to transferable cost anchoring.

The result is a structural gap: PoW value remains mostly confined to securing ledgers and supporting a scarcity narrative, but it does not become a portable credit layer that can be reused for issuance and long term asset maintenance. Closing this gap requires both a transferable cost unit and an asset structure that can inherit that cost through time.

4 HACD as a transferable unit of verifiable cost and the first Hybrid Stack Token

We focus on HACD because it is not only a native PoW asset unit, but also the first Hybrid Stack Token [6]. Its Hybrid Stack structure provides inheritable identity, state, and lifecycle event modeling so that a PoW cost anchor can become an intrinsic, inheritable property at the asset layer.

HACD is a native asset on the PoW ledger Hacash and emerged from the system design in early 2018 [2]. Since the first HACD was produced on May 16, 2019 [5], the ecosystem has validated issuance mechanics, unit level identity, and public history, and has explored programmable expression through the HIP process such as HIP 5, 8, and 9 [3][4].

4.1 Identity, gene, and storage

The unit structure of HACD includes three key elements. The first is the DID identity space. Each HACD DID is composed of six randomly selected letters from a set of 16 letters, so the total space is 16^6, that is 16,777,216 units [2]. The second is a unique hash, often called the gene, determined randomly at creation time and immutable, providing a nonreplaceable seed for programmable expression. The third is an on chain storage space of about 12.5 KB, used to carry text or binary data. Storage state can be cleared through on chain operations under protocol rules while historical records remain, and each clearing consumes an average bidding cost [3].

4.2 Fungibility, stacking, composability, and scarcity premia

Although HACD is composed of different six letter DIDs and each unit has its own serial number and gene, giving it clear non-fungible characteristics on chain, it can also be treated as fungible by higher level market consensus for adoption and trading. In other words, HACD can carry differentiated expression and scarcity attributes at the unit level, while also forming deeper liquidity and more consistent pricing at the aggregate supply level.

Within HACD's Hybrid Stack Token structure, assets can be created or bound on a single HACD, and can also be created or bound across multiple different HACDs. A single HACD can stack multiple assets as long as the holder has sufficient HACD quantity and the required storage space and satisfies protocol constraints. Therefore, HACD is not only a PoW cost unit, but also a programmable container for asset composition and relationships.

Because HACD units differ in six letter DID, serial number, and gene, and because each HACD can carry a different set of stacked assets, some HACDs may have special properties that others do not. This creates room for scarcity premia, including premia from the scarcity of a specific HACD unit, the scarcity of assets stacked on it, and the compositional scarcity premium created by combinations and relationships among multiple stacked assets. As stacking patterns evolve, new forms of premium formation can emerge and create new market discovery mechanisms.

Once assets are stacked on a HACD, the most direct identifier returns to the HACD six letter DID. Each HACD corresponds to an address on the Hacash mainnet and ownership changes through address to address transfer. This means the six letter DID of HACD can naturally assume the role of DNS resolution for addresses, and can also serve as DNS for stacked assets. Remembering the six letter DID or the serial number is sufficient to query the full HACD state and to transfer the HACD together with its stacked asset state under the applicable rules.

Together, these structures make HACD an identifiable, traceable, and referenceable PoW cost unit, and enable it, as the first Hybrid Stack Token, to serve both fungible liquidity and non-fungible premium expression. This creates the conditions for the next crucial step: migrating PoW value onto other assets.

5 Core claim: PoW value migration requires HACD's Hybrid Stack Token structure

In this litepaper, PoW value migration does not mean paying HACD as a fee, nor locking HACD as collateral, nor using HACD as external backing. PoW value migration means that verifiable real world cost and public history become intrinsic properties of an asset and remain inheritable as the asset transfers and evolves. To achieve that, four conditions must hold.

First, cost must exist as a bindable unit, not as a one time fee. A cost unit must be addressable, referencable, lockable, and spendable in a way that can be audited on public history.

Second, the asset must have an inheritable identity and state, so that cost commitments can be written into the asset structure rather than remaining in an external contract or platform database.

Third, lifecycle events must be expressible as a verifiable sequence. Issuance, transfers, upgrades, disclosures, governance changes, and retirement must become auditable events, otherwise cost anchoring collapses into an initial payment with no long term credit maintenance.

Fourth, the binding between cost and the asset must not be easily replaceable. If linkages can be remapped through rewrapping, redeployment, or bridge reinterpretation, cost becomes a narrative label rather than a hard credit constraint.

Most token types satisfy only part of these requirements. Fungible tokens erase unit identity. Conventional NFTs have unit identity but typically lack a native model for cost anchoring and lifecycle event auditing, and the linkage to PoW assets is often replaceable. Inscription like designs emphasize timestamp and traceability rather than inheritable cost anchored lifecycle credit. Wrapped and bridged assets usually place PoW assets outside the asset itself as collateral, shifting trust to the wrapping layer.

Therefore, PoW value migration does not automatically occur simply because a PoW asset exists. It requires the PoW asset to provide inheritable identity, state, and lifecycle event modeling through a Hybrid Stack Token structure so that cost anchoring becomes intrinsic and inheritable at the asset layer. In our system, HACD is that structure.

6 Issuance mechanics and marginal cost dynamics: compute plus bidding

HACD is not the block reward of the Hacash ledger. The block reward is HAC. HACD issuance occurs in cycles of five blocks and combines mining with bidding.

In each five block cycle, miners can produce candidate six letter HACDs and bid using HAC. The minimum bid is not less than one block reward. During the first four blocks of the cycle, bids are recorded and compared. At the end of the four blocks, the highest bid candidate becomes the locked winner and is finalized in the fifth block. Ninety percent of the bid HAC is destroyed, and ten percent is paid to the miner who packages the settlement block. Because each Hacash block is about 5 minutes, one five block cycle is about 25 minutes. Therefore, the theoretical upper limit of HACD output is about 58 per day [2].

This bidding mechanism imports demand information into issuance and reduces pure hardware dominance. Producing multiple candidates does not guarantee multiple wins without winning the bid competition. In effect, unit level cost is shaped by both work and bid.

In addition, HACD difficulty rises as issuance accumulates and trends upward over long horizons rather than oscillating in periodic readjustments. This creates a long term marginal cost effect where producing new units becomes progressively more costly, supporting a durable cost anchored scarcity profile. Moreover, since HACD is not a block reward for maintaining ledger security, its issuance can decrease when demand is insufficient, which is crucial for early value stability.

As of January 3, 2026, the theoretical maximum total issuance is about 140,000, about 0.8% of total supply, while the actual issuance is about 120,000, about 0.7%.

7 HACD Stack Token Protocol: a standard for issuance and redesign of existing assets

Bringing PoW to everything requires two directions to be true at the same time. New assets must be able to inherit PoW anchored credibility. Existing assets must be able to be redesigned so that key facts, disclosures, and lifecycle events enter a verifiable framework and gain stronger long term trust maintenance.

HACD Stack Token Protocol defines how stacked assets are issued and evolve on HACD. It standardizes identity, state commitments, and lifecycle event recording so that wallets, explorers, markets, and applications can read and verify assets without permission. This shifts asset credibility away from platform databases and announcements and toward public history plus verifiable cost constraints.

From a market perspective, HACD Stack Token Protocol addresses an issuance trilemma: composability, credible scarcity, and usability are difficult to maximize at the same time. Contract based issuance is highly composable but often lacks externally verifiable scarcity. Inscription based issuance borrows public history but is constrained by base layer usability and limited programmability. High throughput chains provide usability but often drift toward low cost replication and attention driven issuance. HACD provides credible scarcity via a transferable cost unit, and its Hybrid Stack structure makes this credibility inheritable through lifecycle events. A high performance execution environment is then required to restore usability and composability without sacrificing the cost anchored credit foundation.

8 HACD chain and HVM: bringing PoW backed assets into composable application markets

Credibility alone is not enough. Assets become economically meaningful when they can be used in liquid, composable markets. For that, we introduce a high throughput HACD chain and Hacash Virtual Machine (HVM) as the execution environment [7]. Stack Tokens can move through cross chain mechanisms into an environment that supports trading, market making, lending, collateralization, derivatives, and payments while preserving their PoW anchored credibility.

This layer is not an optional feature. It is the usability and composability bridge that allows credible scarcity to function inside real application markets. As stacked assets grow in scale, demand and liquidity for HACD as the base cost unit can strengthen in parallel. Deeper HACD liquidity and a more stable cost anchor can then reduce the bootstrapping and trading friction of each stacked asset, improving practical utility and liquidity, forming a self reinforcing ecosystem flywheel.

9 Impact: from attention markets to credit markets

If PoW value migration is achieved through Hybrid Stack structure, the asset world gains a new primitive. Assets are not only created. They are maintained as auditable sequences of facts. Issuance becomes a beginning. Disclosure becomes a verifiable event. Governance becomes a traceable change log with accountability.

This applies to both new issuance and asset redesign. Many assets already have market value but lack verifiable disclosure, auditable history, and a credible accountability timeline. Migrating them into a structure where identity, state, and lifecycle events are bound to public history can improve trust maintenance, which itself is a form of value.

10 Limitations and non goals

This litepaper does not claim that PoW automatically creates demand. PoW provides a credit structure and a cost anchor. Adoption and price remain market outcomes.

This litepaper does not claim that all assets require PoW. The claim is that when assets require long term trust maintenance, verifiable disclosure, and non repudiable history, PoW anchored public history and verifiable cost are among the strongest foundations.

This litepaper does not treat Hybrid Stack Token as marketing packaging. Hybrid Stack structure is required to meet the conditions of PoW value migration. Without inheritable identity, state, and lifecycle event modeling, PoW can be referenced externally but cannot be inherited intrinsically.

11 Roadmap and verifiable milestones

We express progress as four milestones:

Phase 1: Protocol and tooling
Finalize HACD Stack Token Protocol specification and reference implementation, deliver basic wallet and explorer support, and standardize lifecycle event formats.

Phase 2: Asset level validation
Launch a set of Stack Tokens and redesign pilots for existing assets, validate observable relationships among cost anchoring, lifecycle events, and market behavior, and produce reusable issuance and redesign templates.

Phase 3: Execution environment and cross chain
Deliver HACD chain and HVM testnet and core modules, complete security reviews and stress testing for critical bridging paths, and enable low friction composability.

Phase 4: Scale and ecosystem flywheel
Measure growth by real usage metrics such as on chain event volume, asset retention, liquidity depth, application integrations, and developer participation, aiming for self sustaining expansion.

12 Conclusion

Bring PoW to Everything does not mean attaching PoW as a decorative label. It means making PoW a credit primitive at the asset layer, so that public history and verifiable real world cost become default properties of assets. HACD provides a transferable cost unit and, as the first Hybrid Stack Token, provides the inheritable structure needed for PoW value migration. The Stack Token Protocol standardizes issuance and redesign. The HACD chain and HVM bring these assets into composable markets. At scale, asset creation shifts from competing on replication speed to competing on long term trust maintenance.

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