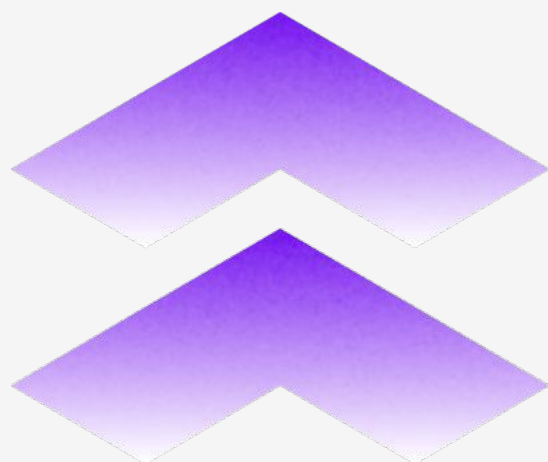


Elastos:

Examining a Bitcoin-Secured Framework for Decentralized Finance



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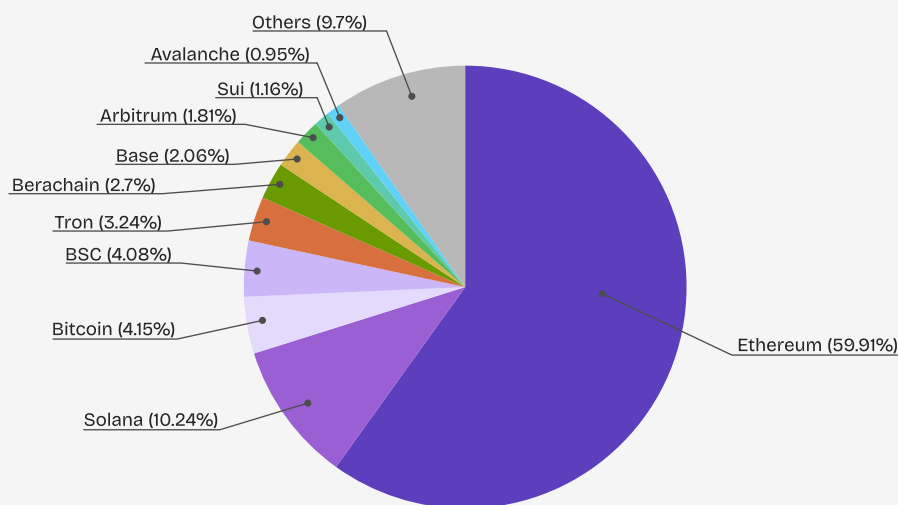
1. Introduction and Market Context

1.1 Overview of decentralized finance (DeFi) and the increasing importance of Bitcoin

The blockchain ecosystem expands rapidly and decentralized finance (DeFi) is one of its most important applications. As of January 2025, the total value locked (TVL) across DeFi protocols has exceeded \$175 billion, driven largely by applications built on Ethereum and other smart contract-enabled blockchains.

Ethereum alone accounts for over 55% of DeFi activity, solidifying its position as the dominant platform in this sector (Figure 1).

Figure 1: TVL across Chains

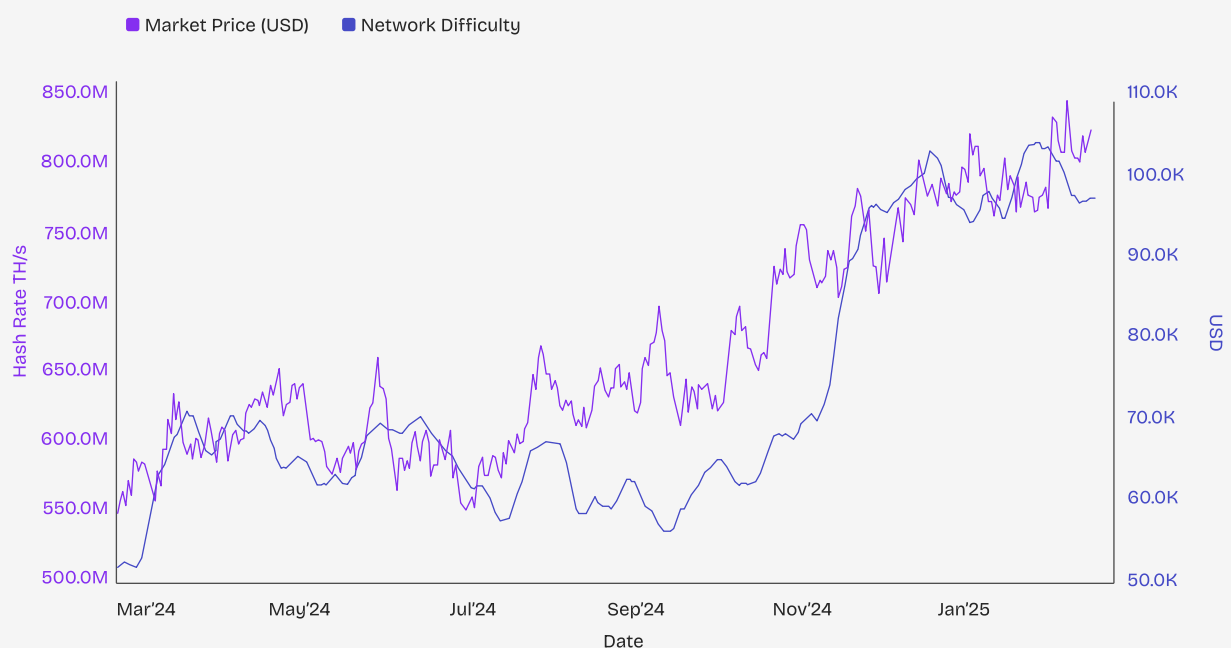


Source: [DefiLlama](#)

Bitcoin, widely regarded as "digital gold," remains the most secure and decentralized blockchain, with a hash rate **exceeding 800 exahashes per second (EH/s)** as of early 2025 (Figure 2). However, its architectural design prioritizes security and decentralization over programmability and lacks native smart contract functionality.

This limitation has historically restricted Bitcoin's direct involvement in DeFi, leading to the rise of alternative solutions that attempt to integrate Bitcoin's security and liquidity into decentralized financial systems.

Figure 2: Hashrate to price ratio



Source: [Blockchain.com](https://blockchain.com)

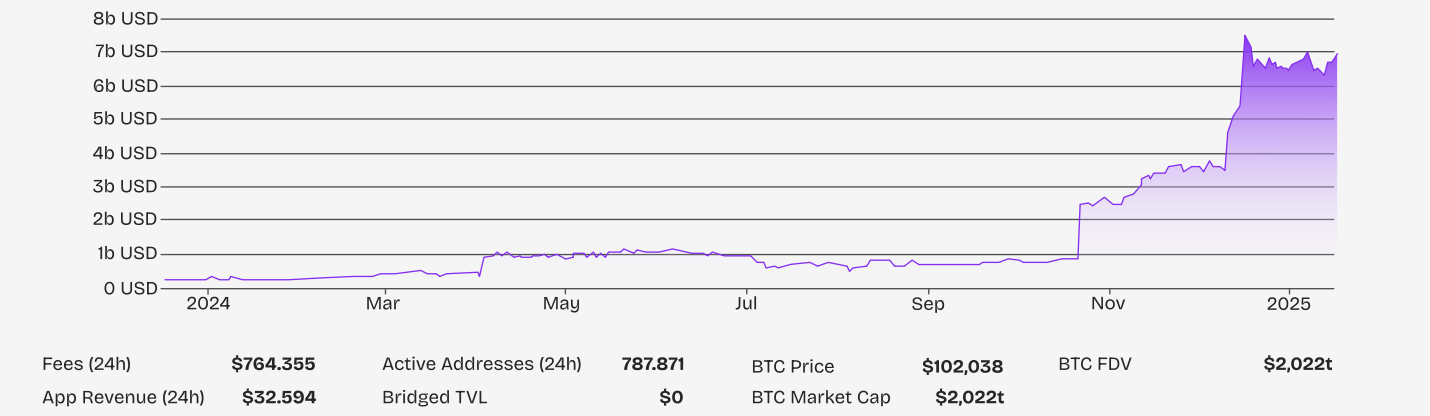
1.2 An introduction to Bitcoin-centric assets

Over the past two years, advancements in smart contract interoperability and layer-2 scaling solutions have enabled Bitcoin to take on a more active role in DeFi. This has driven the emergence of BTCFi as a distinct sector. BTCFi is aimed at transforming Bitcoin from a passive store of value into an actively utilized financial asset.

These include synthetic or wrapped BTC tokens deployed on alternative blockchains, fully custodial or trustless bridges that enable Bitcoin transactions on smart contract platforms, and entire networks that anchor their security to Bitcoin's consensus model.

As of December 31, 2024, the TVL in Bitcoin-native DeFi solutions **reached approximately \$6.5 billion**, a significant increase from \$307 million at the beginning of the year, marking a 2,000% growth (Figure 3).

Figure 3: BTCFi market TVL



Source: [DefiLlama](#), [Cointelegraph](#)

The necessity of Bitcoin-native DeFi stems from several factors. First, Bitcoin remains the largest and most liquid cryptocurrency, with a market capitalization **exceeding \$2 trillion**.

Despite this, the majority of its supply - **more than 50%** - remains largely inactive, stored in cold wallets or held as long-term investments. Unlocking Bitcoin’s liquidity without requiring holders to sell their assets has become a priority for digital asset market innovation.

This has led to the development of Bitcoin-backed lending platforms, collateralized stablecoins, and other financial instruments that allow Bitcoin holders to engage with DeFi but maintain exposure to BTC’s price appreciation.

Second, Bitcoin’s security model and decentralization offer a distinct advantage over both DeFi and centralized ecosystems.

While Bitcoin in Ethereum and other smart contract platforms enables complex financial applications, these systems remain vulnerable to security breaches, exploits, and centralization risks.

Wrapped Bitcoin (WBTC) exemplifies this, relying on custodians to issue synthetic Bitcoin, introducing counterparty risk and severing its connection to Bitcoin’s native security. The 2022–2023 collapses of **Celsius** and **BlockFi** further exposed the dangers of centralized, Bitcoin-backed finance.

These failures underscore demand for such services while revealing custodial vulnerabilities, reinforcing the need for decentralized, non-custodial solutions. In contrast, Bitcoin’s proof-of-work security model and immutable ledger provide a trustless foundation that mitigates these risks.

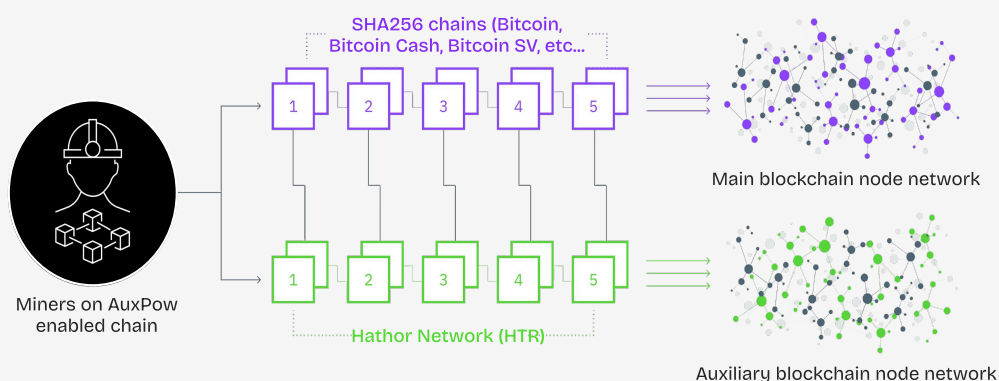
2. Merged Mining and the Role of Bitcoin-Secured Networks

2.1 Explanation of merged mining

The security of blockchain networks has become one of the most critical factors in determining their reliability and adoption. While Bitcoin's computational power renders it the most tamper-resistant blockchain, smaller or standalone networks often struggle to achieve comparable levels of security.

Merged mining has emerged as a solution to this problem that enables secondary blockchains to inherit Bitcoin's security in the form of sharing its hash power (Figure 4).

Figure 4: Merged mining explained



Source: [Hathor](#)

Merged mining, technically referred to as **auxiliary proof-of-work (AuxPoW)**, allows miners to solve cryptographic puzzles that are valid for both Bitcoin and a secondary blockchain simultaneously. This method leverages the same computational work miners expend for Bitcoin.

By leveraging Bitcoin's existing mining infrastructure, merged mining

strengthens the security of secondary blockchains that would otherwise struggle to attract sufficient hash rate.

Without this mechanism, smaller proof-of-work blockchains remain highly vulnerable to 51% attacks due to their limited miner participation.

Interestingly, the concept of merged mining dates back to Satoshi Nakamoto, Bitcoin's creator. In 2010, Satoshi shared

his vision for merged mining in Bitcoin forums, proposing the idea that multiple blockchains could share Bitcoin's security and resources without compromising independence.

Satoshi stated: "I think it would be possible to be a completely separate network and separate blockchain, yet share CPU power with Bitcoin".

He further emphasized the collaborative benefits, remarking: "Instead of fragmentation, networks share and help each other".

2.2 Practical advantages of merged mining

Namecoin, launched in 2011 as **the first implementation of merged mining**, demonstrated the practical benefits of this approach. It was designed to function as a decentralized domain name system (DNS) while relying on Bitcoin's mining network for security.

The shared mining process prevented Namecoin from suffering the low hash rate issues that typically affect standalone proof-of-work blockchains.

A similar approach has been applied by Elastos, which has been one of the first projects to adopt **merge-mining with Bitcoin since 2018**. By securing itself with Bitcoin's mining infrastructure, Elastos has eliminated the security risks faced by standalone proof-of-work networks.

As of 2025, **approximately 50% of Bitcoin's total hash rate** validates Elastos blocks which makes it one of the most computationally secure merge-mined networks.

In addition to enhancing security, merged mining offers economic incentives. Miners participating in merged mining can earn rewards from both the primary

blockchain (Bitcoin) and the secondary chain without additional costs.

This dual-revenue model makes merged mining an attractive proposition for miners and creates a mutually beneficial relationship between the networks involved. For platforms such as Elastos, the arrangement also ensures economic sustainability by distributing rewards in a way that encourages miner participation.

Despite these advantages, the adoption of merged mining is not without challenges. One major obstacle is the need to align the technical infrastructure of secondary blockchains with Bitcoin's mining ecosystem.

Compatibility issues can slow down the onboarding process for miners. Furthermore, while merged mining reduces security risks for secondary networks, it indirectly inherits any centralization risks associated with Bitcoin's mining pools. If a small number of pools dominate Bitcoin's hash rate, the same concentration could potentially impact the governance or integrity of the merge-mined chain.

3. Technological Foundations and Architecture of Elastos

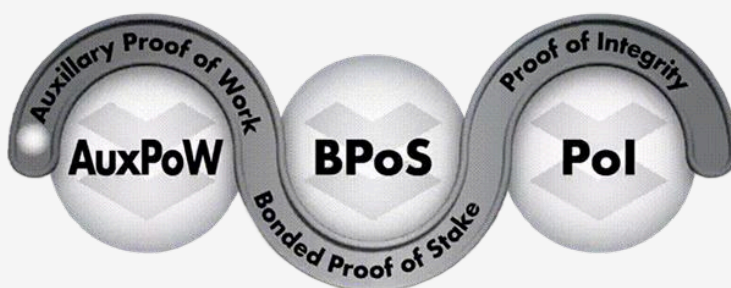
3.1 Detailed exploration of Elastos' Elastic Consensus model

Elastos represents a distinct approach to blockchain architecture which combines Bitcoin's computational security with a multi-layered consensus model designed for scalability and functionality.

Its technological framework is built on a structure called **Elastic Consensus** (Figure 5), which integrates three

distinct mechanisms: Auxiliary Proof of Work (AuxPoW), Bonded Proof of Stake (BPoS), and Proof of Integrity (PoI). Together, these layers provide security, decentralization, and governance while enabling Elastos to support diverse applications.

Figure 5: Elastic Consensus Model



Source: [Elastos](#)

Auxiliary Proof of Work (AuxPoW) serves as the foundation of Elastos' security. By leveraging Bitcoin's hash rate through merged mining, Elastos ensures its mainchain is protected by the same computational power that secures Bitcoin.

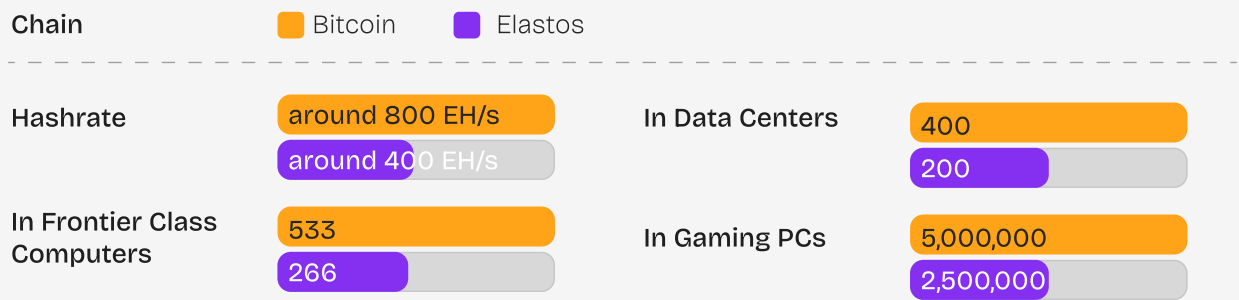
As of 2025, Elastos benefits from nearly 50% of Bitcoin's 800 EH/s hash rate.

This reliance on Bitcoin's mining infrastructure allows Elastos to offer a level of security that would otherwise be unattainable for a standalone chain.

To compare, Elastos’s security is facilitated by power around 400 EH/s which is comparable to **2.4 million high-end gaming PCs** (Figure 6).

Importantly, AuxPoW achieves this without requiring additional energy consumption which in turn aligns with growing global concerns about blockchain sustainability.

Figure 6: Power Equivalents



Source: [Elastos](#)

The second layer of Elastos’ consensus model, Bonded Proof of Stake (BPOS), is designed to enhance the efficiency and finality of its blockchain operations. BPOS reduces block confirmation times to **approximately 2 minutes**, improving transaction finality while maintaining decentralization.

Additionally, the system enables validators to secure transactions with an average finalization latency of 6 blocks (≈12 minutes), ensuring faster settlement compared to traditional PoW-based networks.

In the **BPOS mechanism**, network participants stake their ELA tokens to become validators and pledge their holdings as collateral to demonstrate their commitment to the system’s integrity. Hence, Elastos offers miners dual rewards: Bitcoin from the primary chain and ELA from its own network.

The ELA token plays a critical role in the Elastos ecosystem, not just as a staking asset but as the fundamental unit of value across its decentralized applications and services. ELA has **a fixed maximum supply of 28.22 million tokens** to ensure limited inflationary dilution (Figure 7).

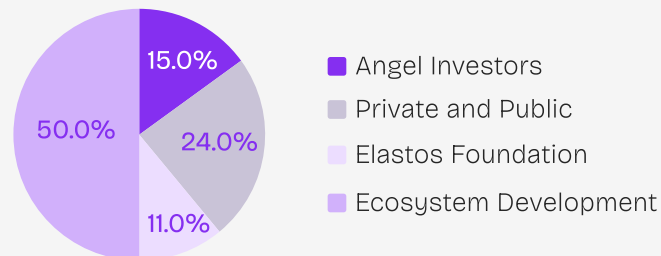
As of early 2025, approximately 22.5 million ELA are in circulation. Miners and community members can stake ELA tokens and **earn 2-3% APR** while contributing to the network’s security and governance.

The BPOS mechanism also aligns miner incentives with the long-term health of the ecosystem, as longer staking durations provide higher rewards. The token is also required for network transactions, including gas fees on the Elastos Smart Chain.

A portion of staking rewards and transaction fees is allocated to a Proof of Integrity (PoI) treasury fund to ensure long-term sustainability and development funding.

Elastos has also incorporated periodic token burns to reduce supply and enhance scarcity, benefiting long-term holders such as **the event on July 30, 2020**.

Figure 7: ELA token distribution



Source: [Coincarp](#)

The third component, **Proof of Integrity** (PoI), governs the decentralized decision-making processes of Elastos. PoI operates through the **Cyber Republic**, a decentralized autonomous organization (DAO) that empowers ELA token holders to participate in the open governance of the network.

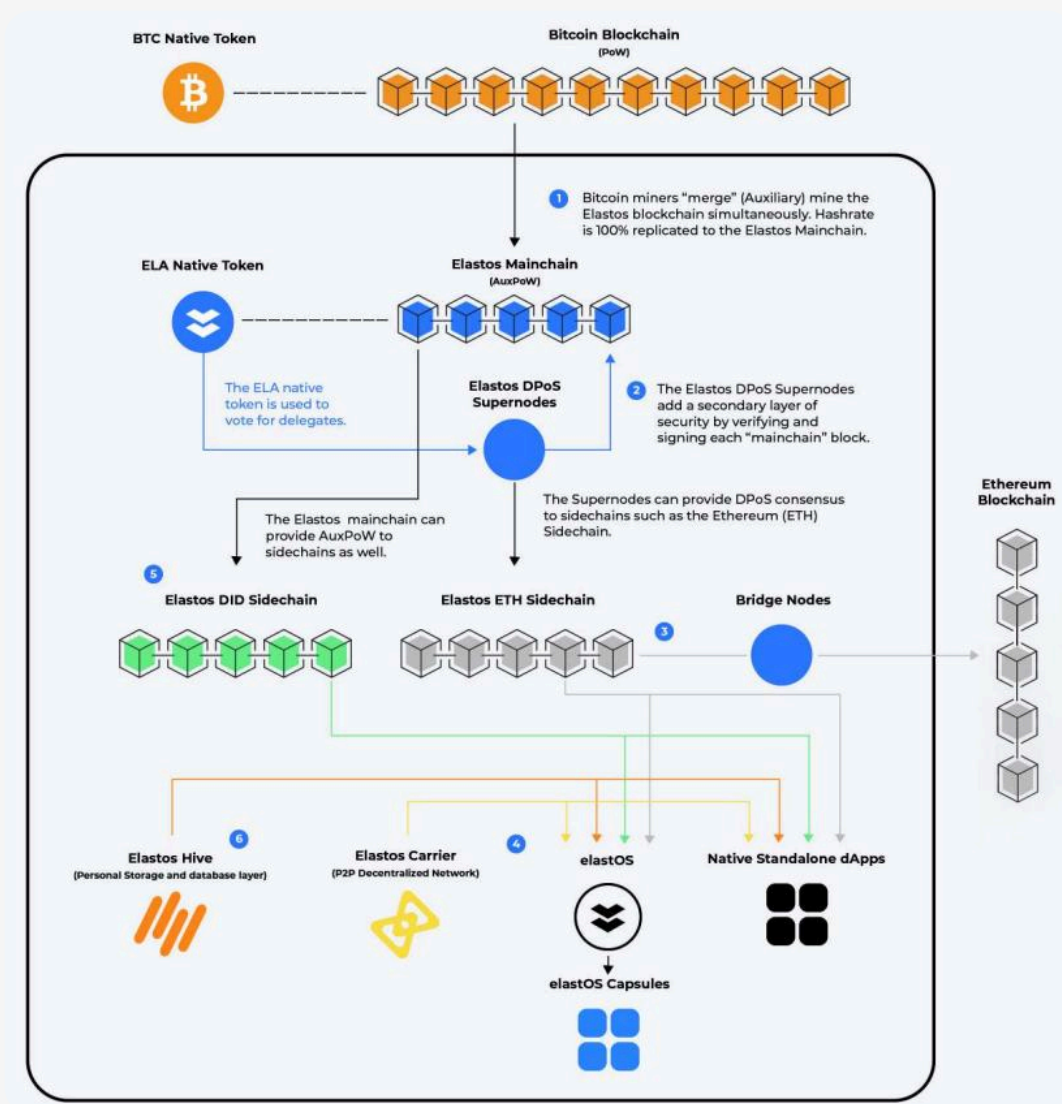
Token holders can propose and vote on initiatives, including funding allocations, technical upgrades, and ecosystem expansion strategies. The Cyber Republic **is formally registered** in the Marshall Islands and provides legal recognition to its governance framework. This combination of decentralized voting and legal structuring creates a transparent and inclusive system.

3.2 Practical applications of Elastos' technology

Elastos' architectural design also includes sidechains, which serve as specialized environments for executing decentralized applications (dApps) and smart contracts. **The Elastos Smart Chain**, an Ethereum Virtual Machine (EVM)-compatible sidechain, enables developers to deploy dApps and access tools commonly used in the broader blockchain ecosystem.

Additionally, **Elastos' Identity Chain** provides a decentralized identity framework and allows users to own and control their personal data. These sidechains interact with the mainchain through the Elastic Consensus mechanism and ensure security and interoperability across the network (Figure 8).

Figure 8: Elastos architecture



Source: [Elastos](https://www.elastos.org/)

The Elastic Consensus model addresses the need for robust security and, in addition, offers scalability and adaptability for future use cases. By separating its mainchain and sidechains, Elastos can focus the mainchain on security while enabling high-performance, application-specific sidechains to handle complex computations.

This layered approach mirrors the modular architecture employed by leading blockchain ecosystems and positions Elastos as a competitive platform for decentralized finance, identity management, and beyond. This multi-faceted framework underpins Elastos' vision of building a secure, scalable, and decentralized ecosystem for the digital economy.

4. Elastos in Bitcoin-Centric Decentralized Finance (BTCFi)

4.1 Elastos' role in BTCFi

Elastos' role in BTCFi is underpinned by its ability to combine Bitcoin's security with advanced smart contract capabilities. Its design and architecture positions Elastos as a bridge between Bitcoin's security and the programmability required for DeFi applications.

Central to Elastos' BTCFi positioning is the strength of its native token, ELA, which benefits directly from Bitcoin's robust security. By inheriting over 50% of Bitcoin's hash rate through merged mining, ELA distinguishes itself as one of the most secure digital assets within the BTCFi landscape, positioning it as a highly trusted Bitcoin-secured reserve asset.

Another contribution to BTCFi is Elastos's support for decentralized lending and stablecoin issuance through its **BeL2.org** project.

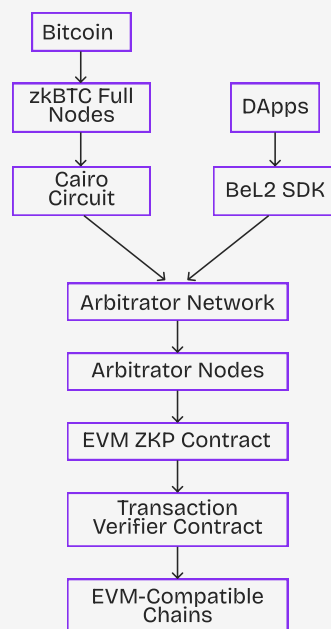
The launch of the BeL2 arbiter network is scheduled for Q1 2025. This network utilizes zero-knowledge proofs (ZKPs) to verify Bitcoin transactions on Elastos and broader Ethereum networks.

The significance of this design lies in its ability to enable truly trustless, on-chain Bitcoin DeFi by addressing one of the biggest challenges in BTCFi: the reliance on custodians or synthetic Bitcoin derivatives.

By using ZKPs, the arbiter network, collateralized in ELA, ensures that Bitcoin remains locked on its native chain while proofs are passed into smart contracts across networks for complex DeFi applications, maintaining security and eliminating counterparty risk (Figure 9).

Furthermore, BeL2.org provides a foundation for institutional-grade DeFi, enabling regulatory compliance through zero-knowledge proofs via its decentralized identity (DID) blockchain.

Figure 9: Bel2 architecture



Source: [Bel2.org documentation](https://bel2.org)

This innovation has already generated significant institutional interest, exemplified by a Harvard student and alumni initiative developing a BTC-backed stablecoin on the BeL2 platform.

4.2 Key applications

With Bitcoin's security anchored in Elastos' technologies, BeL2.org introduces a decentralized **lending protocol** framework that allows Bitcoin to serve as collateral for loans denominated in stablecoins.

This lending platform operates without intermediaries and utilises smart contracts on the Elastos sidechain to automate the loan issuance and repayment process.

By keeping Bitcoin locked on its native blockchain and using zero-knowledge proofs to interact with Elastos' smart contracts, BeL2.org ensures that the system remains trustless and secure.

This architecture facilitates interoperability between Bitcoin and other blockchain networks, effectively uniting all innovations together in a secure manner.

This enables Bitcoin to interact with EVM-compatible blockchains, opening the door to cross-chain DeFi applications. For instance, by using ELA-collateralized arbiter nodes, Elastos enables Bitcoin to talk with any popular network without minting new assets on either chain.

This interoperability aligns with the growing demand for multi-chain solutions that integrate Bitcoin into the broader blockchain ecosystem while retaining the security of Bitcoin's mainchain in a non-custodial manner.

4.3 Analysis of Elastos's market adoption and positioning

An important distinction for Elastos is its development of cross-chain interoperability and decentralized identity (DID) frameworks, expanding its utility beyond financial services. Elacity, an ecosystem platform within Elastos, exemplifies this versatility by enabling secure, peer-to-peer digital asset exchanges powered by ELA tokens.

A key innovation of Elacity is its **decentralized digital rights management (DRM) system**, ensuring creators retain full ownership and control over their digital content. By encrypting data and tokenizing access and royalties into tradable NFTs, Elacity provides a robust framework for secure licensing and distribution without reliance on centralized platforms, all while leveraging Bitcoin's security model.

What is more, Elastos has expanded its market accessibility with **listings on major exchanges**, including Coinbase, KuCoin, and HTX among others, which are aimed at increasing liquidity and trading volume.

To assess Elastos’ standing within BTCfi, the table below compares Elastos with major competitors, Stacks (STX) and Rootstock (RIF), across technological and adoption metrics.

Figure 10: BTCfi projects comparative table

Metric	Elastos (ELA)	Stacks (STX)	Rootstock (RIF)
Bitcoin Security Share	~50%+ of Bitcoin's hashrate	100% of Bitcoin's Finality	<u>~80%+ of Bitcoin's hashrate</u>
EVM Compatibility	Full	Partial (Clarity language)	Full
Smart Contract Type	Trustless via BeL2	Limited (non-EVM, Clarity language)	EVM-compatible
Institutional Projects	BTC-backed Stablecoin (Harvard Student-Led Team)	None reported	RIF DeFi integrations
Exchange Listings	Coinbase, KuCoin, Huobi, Gate.io, BitGet + 2	Binance, OKX, KuCoin, Kraken, Gate.io + 6	Binance, KuCoin, BitGet, Gate.io + 8
Cross-Chain Interoperability	Focus on interoperability with multiple blockchains, including Ethereum and Bitcoin	Primarily operates as a layer on Bitcoin, with limited cross-chain capabilities	Designed to facilitate interoperability between Bitcoin and Ethereum
Decentralized Identity (DID)	Implements DID solutions for secure, self-sovereign identity management	Offers decentralized identity through the BNS (Blockchain Naming System)	Does not natively support decentralized identity solutions

Source: [Cointelegraph Research](#)

4.4 Challenges and Opportunities

Despite its technological edge, Elastos faces several challenges. Regulatory uncertainty, particularly in key markets such as the EU, where severe compliance standards for DeFi projects create uncertainty, constrains institutional participation.

Although Elastos’ decentralized identity (DID) frameworks align with privacy-focused regulations, the evolving legal landscape surrounding Bitcoin-centric

DeFi protocols could slow institutional participation. In the US however, the situation may positively change with the new **pro crypto approach of Trump’s administration**.

Ecosystem awareness also remains a barrier. While Elastos offers a comprehensive BTCfi solution, limited outreach and community engagement have resulted in lower visibility compared to competitors such as Stacks.

The delay in launching the BeL2 Arbiter Network due to complex zero-knowledge proof integrations has further hindered momentum.

Technological maturity poses additional challenges. Integrating Bitcoin's security with scalable smart contract capabilities is complex. Although Elastos' EVM-compatible sidechains provide a familiar environment for developers, interoperability with other blockchains requires further refinement.

Additionally, the Elacity marketplace, while innovative with its decentralized DRM model, needs broader adoption among creators to drive Web3 engagement.

Overcoming these challenges will require strategic initiatives, including regulatory collaboration, marketing campaigns to enhance ecosystem awareness, and continued technological development. Elastos' strong foundation through merged mining and institutional interest signals its potential to scale adoption despite these barriers.

5. Future Potential and Industry Trends

5.1 Emerging trends in blockchain

Advancements in quantum resistance and cross-chain interoperability are driving significant progress in blockchain technology. Quantum resistance is essential for protecting cryptographic protocols from emerging quantum computing threats, which could compromise traditional cryptographic methods.

Researchers **are actively exploring** post-quantum cryptographic techniques, including lattice-based, hash-based, and multivariate polynomial cryptosystems, to safeguard blockchain networks.

As quantum computing capabilities advance, the urgency for quantum-resistant blockchains intensifies which makes it a central pillar for future security frameworks.

However, Elastos' deep integration with Bitcoin's security through merged mining positions it to inherit future cryptographic upgrades from the Bitcoin ecosystem which will enhance its quantum resistance.

In parallel, cross-chain interoperability is even more important for the modern blockchain world. It is crucial for liquidity enhancements, user access expansion, and new cross-protocol use cases unlocks.

Emerging technologies such as layer-zero protocols, sidechains, atomic swaps, and cross-chain bridges are breaking down the barriers of isolated ecosystems. Projects such as Polkadot, Cosmos, and Thorchain exemplify how interoperability hubs facilitate asset and data transfers across chains.

Elastos, leveraging its decentralized identity, smart chains and secure data exchange frameworks, is strategically positioned to capitalize on these trends by integrating cross-chain compatibility to enhance its ecosystem utility and resilience without sacrificing security which is inherited from Bitcoin.

5.2 The potential for Bitcoin-secured assets

Bitcoin-secured assets play a crucial role in driving innovation in both decentralized governance and infrastructure.

In decentralized governance, these assets are increasingly used within DAOs to establish transparent, trustless voting and decision-making processes.

Projects such as **AI Kallipolis**, an experimental initiative blending artificial intelligence with blockchain technology, showcase how advanced technologies can redefine governance models. Inspired by Plato's concept of an ideal state, AI Kallipolis integrates machine learning algorithms with decentralized voting systems to create a self-regulating, adaptive governance structure.

The AI continuously analyzes voting patterns, proposal outcomes, and community sentiment to provide informed recommendations and optimize decision-making processes.

The significance of AI Kallipolis lies in its potential to eliminate inefficiencies and biases that often plague traditional and decentralized governance models. By integrating AI, it reduces the risk of governance attacks, such as vote-buying or collusion, while ensuring that decisions align with the long-term interests of the community.

Additionally, its ability to adapt to changing conditions allows for more resilient governance frameworks capable of evolving with technological and social shifts.

Elastos' Cyber Republic, with its model emphasizing decentralized voting and community-led initiatives, aligns closely with the principles of AI Kallipolis. Both initiatives highlight the potential of Bitcoin-based assets to underpin secure, transparent, and efficient decision-making frameworks.

By leveraging Bitcoin's security alongside AI-driven insights, these projects collectively push the boundaries of decentralized governance and set a precedent for future DAOs and blockchain-based communities.

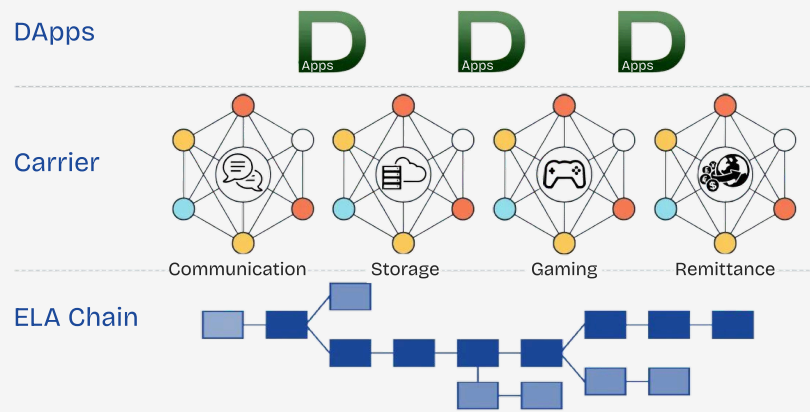
On the infrastructure side, Bitcoin-secured assets can become remarkable in advancing the DePIN sector, which uses blockchain to manage and monetize physical resources.

These networks power services such as decentralized storage, IoT connectivity, and energy distribution. Leveraging its **Carrier network**, Elastos powers peer-to-peer data sharing, storage solutions, and supports decentralized content marketplaces, such as **Elacity**.

The Carrier network is a decentralized, peer-to-peer communication layer that facilitates secure and private data transmission without reliance on centralized servers (Figure 11).

It enables users to maintain full control over their digital interactions, ensuring censorship resistance and enhanced security. It can serve as a backbone for distributed networking solutions, supporting decentralized cloud storage, IoT connectivity, and secure machine-to-machine communication.

Figure 11: Carrier explained



Source: [Elastos](#)

5.3 Implications for reshaping TradFi and DeFi

The integration of Bitcoin-secured assets into DeFi protocols carries significant implications for both traditional finance and the evolving DeFi ecosystem. These assets can act as secure collateral in lending platforms, facilitate synthetic asset creation, and enhance cross-chain liquidity pools.

By reducing reliance on traditional financial intermediaries, these innovations democratize access to financial services and foster more inclusive economies.

Moreover, decentralized governance models such as Elastos' Cyber Republic provide a transparent and community-driven framework for decision-making, potentially inspiring reforms in corporate governance and public policy management.

Cross-chain lending protocols and automated market makers (AMMs) powered by Bitcoin-secured assets enhance capital efficiency and liquidity within DeFi markets. Collectively, these trends highlight the transformative potential of Bitcoin-secured assets within both decentralized and traditional financial systems.

Conclusion

Elastos has emerged as a significant player within the BTCFi ecosystem by using Bitcoin's security through merged mining and offering scalable DeFi solutions via its EVM-compatible sidechains. Its initiatives, such as the BeL2 Arbiter Network, highlight its capacity to drive innovation in decentralized Bitcoin finance and Web3 applications.

Despite challenges like regulatory hurdles, ecosystem visibility, and technological integration complexities, Elastos remains well-positioned for growth due to its unique technological framework and increasing institutional interest.

Looking ahead, the future of Elastos lies in expanding its adoption within the rapidly evolving BTCFi market. As demand for trustless Bitcoin DeFi solutions grows, Elastos' BeL2 network, decentralized identity frameworks, and cross-chain interoperability solutions will be crucial drivers of adoption.

Additionally, emerging trends like AI-driven governance models through projects such as AI Kallipolis in the AI field and Carrier in the DePIN sector position Elastos as a key enabler of Web3 innovation. Success will depend on Elastos' ability to foster developer engagement, secure institutional partnerships, and enhance community outreach.

In conclusion, Elastos stands not only as a technological innovator but also as a key participant in shaping the next phase of decentralized finance, with strong potential to become a cornerstone of the broader digital economy.

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