neura

The Hypercharged L1 for AI & DeFi

By Neura Protocol

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Executive Summary

Neura is a high-performance EVM Layer 1 blockchain with cross-chain interoperability that is optimized for AI and DeFi use cases. Backed by Ankr, an industry leader in global infrastructure services in the Web3 ecosystem, Neura is designed for next-generation applications and utility-driven enhancements centered around the ANKR token. Strategically positioned to deliver superior TPS and performance, with sub-second block times, ultra-low gas fees, and instant finality, Neura is built for near real-time DeFi applications and AI agent interactions.

Key Differentiators

- **Unparalleled Speed & Finality:** Neura achieves sub-second block times with immediate transaction finality, enabling near real-time financial applications and AI agent interactions without the settlement delays common on other networks.
- **100% Ethereum Compatibility:** Built with full Ethereum Virtual Machine (EVM) compatibility, Neura allows developers to deploy existing Ethereum applications without modifications while benefiting from dramatically improved performance and reduced costs.
- **Cross-chain Interoperability:** Neura will have built-in cross-chain interoperability with Ethereum and Binance Smart Chain and will expand access to alternative virtual machine technologies, such as SVM, Cosmos, and Move VM, reinforcing its role as a key contributor to the cross-chain interoperability ecosystem.
- **Infrastructure Expertise:** Backed by Ankr's proven track record in delivering enterprise-grade blockchain infrastructure services, Neura leverages industry-leading operational experience to ensure network stability, security, and optimal performance.
- **Incentivised Community Engagement & Industry Partnerships:** Novel community incentives and strategic industry partnerships, enabling a vibrant ecosystem by aligning interests across validators, builders, and users.

ANKR Token Utility

The ANKR token serves as the economic backbone of Neura, powering:

- **Gas Fees:** All transactions on the network require ANKR for processing
- **Staking Rewards:** Users can stake ANKR to participate in AI Validator Agent rewards
- **Ecosystem Incentives:** Rewards for developers, users, liquidity providers, and apps
- **Discounts:** Discounted services for certain Ankr products

Target Audience

Neura is purpose-built for:

- **AI Projects:** Integrating agentic frameworks at the infrastructure level as well as seamlessly launching and managing AI agents

- **DeFi Builders:** Creating high-frequency trading platforms and advanced financial products requiring interoperability among ecosystems
- **EVM Developers:** Looking to scale applications with better performance, lower costs, and the ability to onboard any user no matter their technical background
- **Traders & Speculators:** Seeking high-speed, low-fee environments for active participation

Representing a robust implementation of existing blockchain technologies, Neura is designed to serve both established decentralized finance use cases and emerging applications that integrate AI and agentic frameworks. Neura's combination of proven technical foundations and performance upgrades creates a reliable environment where innovation can flourish, supported by an incentivized community and top-tier infrastructure.

1. Purpose

In today's blockchain landscape, developers face significant constraints when building advanced applications that require high performance, EVM compatibility, and cross-chain liquidity. Current solutions often force a choice between throughput and composability—Layer 1 networks like Ethereum prioritize security and decentralization at the expense of transaction speed and cost, while alternative chains often compromise on EVM compatibility, creating friction for developers and fragmenting liquidity. Layer 2 solutions, or rollups, tend to abstract away the trust assumptions inherent in upgradeable contracts, resulting in opaque security guarantees. This reality has hindered innovation at the intersection of AI and DeFi, where specialized and robust infrastructure for integration is lacking despite the growing demand for real-time decision-making and high-frequency transactions.

Neura addresses this gap by providing a purpose-built Layer 1 blockchain that combines the best: full 100% EVM compatibility with breakthrough performance capabilities and interoperability. Developed in association with Ankr, an established industry leader in Web3 infrastructure with a global network of validators and trusted partnerships, Neura creates a high-performance launchpad for both established and experimental technologies. Unlike competing solutions that offer only partial compatibility or focused optimizations, Neura delivers a complete environment where developers can deploy existing Ethereum-based applications without modification while benefiting from sub-second block times and instant finality. This innovative environment supports bleeding-edge AI and DeFi application development alongside engaging community-building initiatives.

Built on a foundation of proven technologies, Neura implements the Hyperledger Besu execution client with Quorum Byzantine Fault Tolerance (QBFT) consensus, providing a secure and efficient permissioned network environment. This technical approach enables the chain to maintain consistent performance while supporting a growing ecosystem of applications. With a carefully structured validator set, liquidity solutions powered by best-in-class cross-chain interoperability, and the ANKR token serving as the economic backbone, Neura demonstrates an unrivaled commitment to enterprise-grade execution. The platform is specifically tailored for AI agents, DeFi builders, and EVM developers seeking better performance, creating a complete environment where innovative applications launch, test, and scale, pushing the boundaries of what's possible in distributed systems.

2. Technology

Neura is built on a robust technical foundation prioritizing performance, reliability, and developer familiarity. The architecture combines proven blockchain technologies with strategic optimizations to create an environment specifically calibrated for high-throughput applications.

Architecture

At its core, Neura is a permissioned Layer 1 blockchain that leverages the Hyperledger Besu client[1] for its execution layer. This enterprise-grade Ethereum client provides a stable foundation while QBFT (Quorum Byzantine Fault Tolerance) consensus enables industry-leading performance metrics.

EVM Compatibility

Neura maintains 100% compatibility with the Ethereum Virtual Machine, ensuring that:

- Existing smart contracts can be deployed without modification
- Standard Ethereum tooling (Hardhat, Truffle, Remix) works seamlessly
- Developers can leverage their existing Solidity knowledge without learning new languages or frameworks
- EVM-based applications can be easily migrated

This compatibility eliminates development friction while still delivering the performance benefits of Neura's optimized architecture, creating an environment where innovation can occur without sacrificing ecosystem connectivity.

Bridge Mechanisms

To ensure seamless asset transfers and cross-chain interoperability, Neura implements canonical bridges to major ecosystems:

- **Ethereum Bridge:** Secure bidirectional transfer of ERC-20 tokens, including ANKR
- **BNB Smart Chain (BSC) Bridge:** Streamlined connectivity to the BNB ecosystem and the BEP20 $ANKR token

These bridges are designed with security as the primary consideration, implementing verification mechanisms and monitoring systems to protect cross-chain assets. The bridging infrastructure enables users and applications to easily access Neura while maintaining connections to established blockchain ecosystems, facilitating liquidity flow and expanding the network's utility. Neura plans to expand cross-chain interoperability to more ecosystems, including SVM, Cosmos, and MoveVM.

Together, these technical components create a blockchain environment that delivers exceptional performance without sacrificing developer experience or ecosystem

1 https://besu.hyperledger.org/

connectivity—the ideal foundation for the next generation of decentralized applications.

Consensus

Neura's consensus layer represents an enterprise-grade and battle-tested design, employing a carefully orchestrated system that delivers both security and exceptional performance. This consensus architecture is specifically engineered to support applications requiring rapid finality and consistent transaction processing.

QBFT

Neura is initially launched using a QBFT consensus mechanism[2], enabling the network's standout performance characteristics:

- **Immediate Transaction Finality:** QBFT provides absolute finality once a block is confirmed. This means transactions cannot be reversed after inclusion, providing immediate onchain settlement for financial applications and AI-driven systems.
- **Fork Prevention:** The consensus mechanism eliminates the possibility of chain forks, as validator agreement is required before block production. This creates a deterministic environment where applications can operate without concerns about chain reorganizations.
- **Efficient Block Production:** The streamlined voting process allows validators to produce blocks at sub-second intervals, creating a responsive network capable of supporting near real-time applications.

This consensus design ensures that Neura maintains consistent performance while providing the security guarantees necessary for high-value transactions and critical applications.

Validator Requirements

Validators on Neura must meet rigorous hardware and operational requirements to ensure network resilience:

- **High-Performance Computing:** Enterprise-grade servers with multi-core processors and substantial memory allocation
- **Network Connectivity:** Low-latency, globally distributed, and high-bandwidth connections with redundant configurations
- **Reliability:** 99.9% uptime guarantees with comprehensive and interactive monitoring systems
- **Future AI Optimizations:** Validators may have the option to incorporate specialized hardware such as GPU acceleration to support future AI-native functionality, including verifiable onchain model inference, distributed training capabilities, and secure federated learning environments

2 https://entethalliance.github.io/client-spec/qbft_spec.html

These requirements ensure that the validator set can maintain the network's performance characteristics while leaving room for future expansions that further integrate AI capabilities directly into the blockchain infrastructure.

Security Model

Neura's initial implementation of a permissioned validator model provides several security advantages:

- **Curated Validator Set:** Initially limited to trusted partners with established reputations in blockchain infrastructure, reducing the risk of suboptimal behavior
- **Transparent Validator Performance:** Fine-grained reporting of validator behavior coupled with an AI-powered monitoring service ensures the situational awareness of all network participants
- **Distributed Governance:** Progressive decentralization through a phased approach that gradually expands the validator set while maintaining performance and the eventual opportunity for community ownership

This transparent security model optimizes trust while maintaining speed and reliability. The permissioned structure allows for responsive network maintenance and rapid implementation of security measures if needed, while community staking initiatives reward performant validators while identifying weak links in the network to optimize network health.

The combination of these elements creates a consensus environment that delivers the performance characteristics of a centralized system with the security guarantees and trust assurances of a decentralized network for next-generation AI-centric blockchain applications.

3. Tokenomics

The ANKR token provides the economic backbone of Neura. As an established digital asset with deep liquidity on major exchanges, L1s, L2s, and an active community, ANKR brings immediate credibility and accessibility to the network. A significant percentage of all fees generated will go back to the community and builders.

At the date of publishing this litepaper there is a total supply of 10 billion ANKR tokens. Neura will facilitate the migration from Ethereum and BSC to the Neura L1 with a 1:1 swap at the launch of this new network via native bridges.

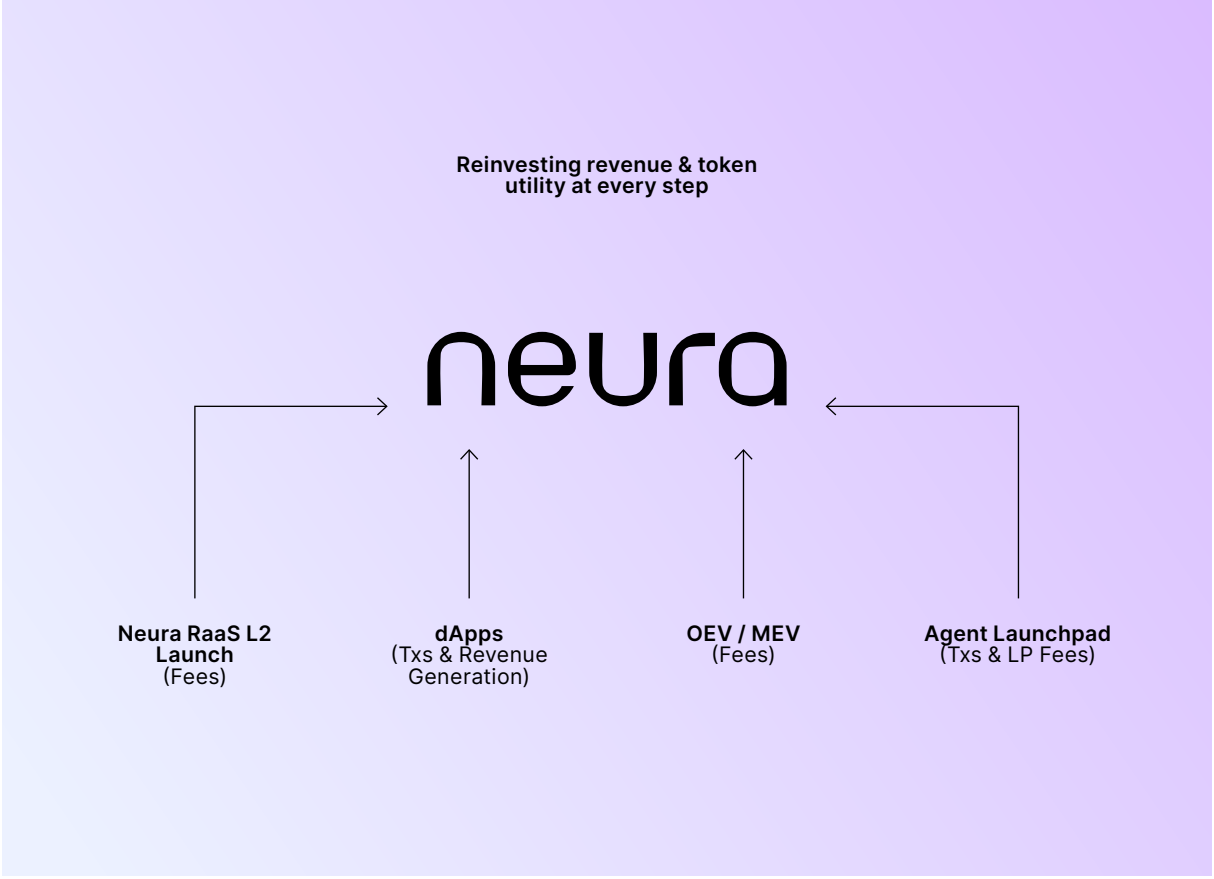

Fig. 1 Neura value flow

Native Token Utility

ANKR serves multiple essential functions within the Neura ecosystem:

- **Transaction Fees:** All operations on Neura require ANKR for gas payments, creating consistent demand for the token as network activity increases
- **Staking Rewards:** Participants can earn ANKR rewards through validator staking and delegation mechanisms
- **Ecosystem Incentives:** Rewards for developers, users, liquidity providers, and apps
- **Discounts:** Discounted services for certain Ankr products

This multifaceted utility creates natural demand for ANKR while ensuring the token remains in active circulation throughout the ecosystem.

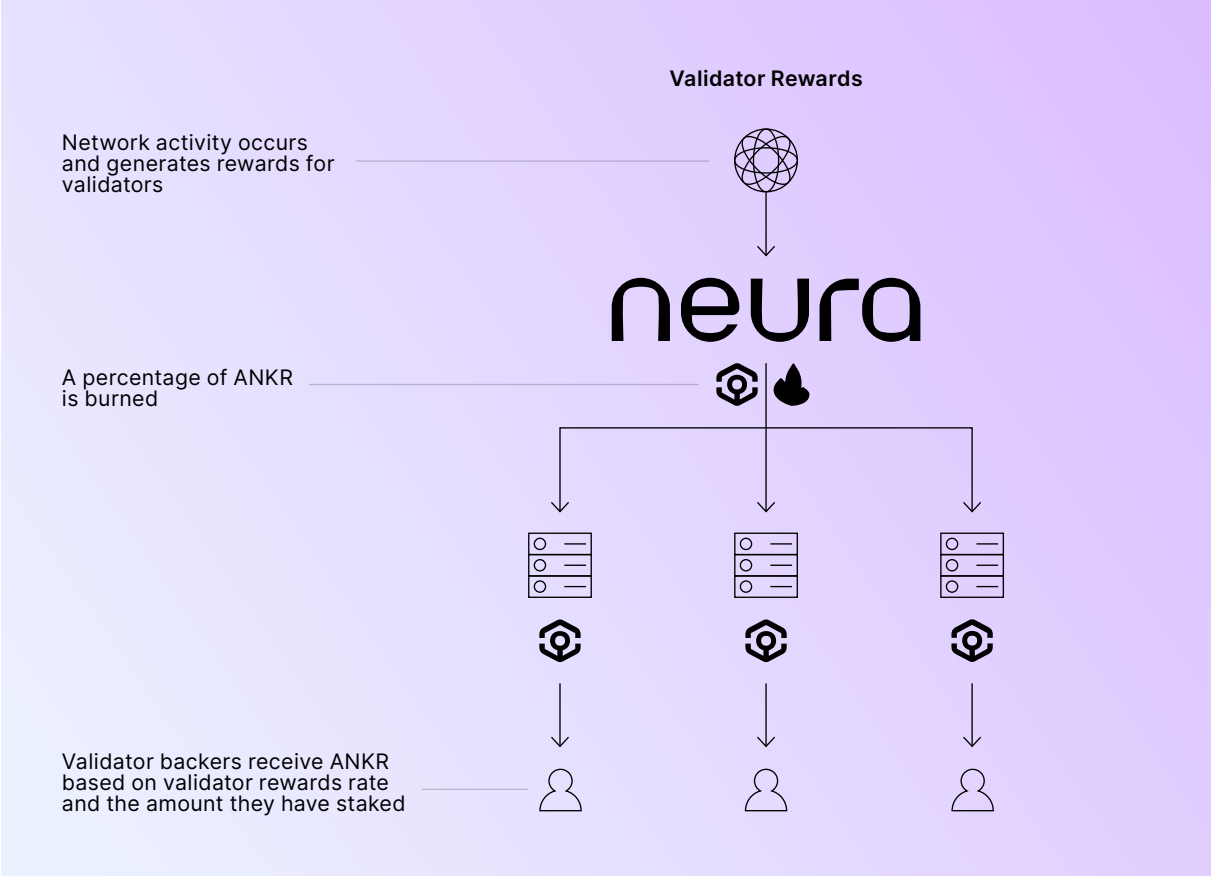

Fig. 2 ANKR utility

Real-Time Burning Mechanism

Neura implements a deflationary mechanism that continuously reduces ANKR supply:

- **Gas Fee Burning:** A percentage of all transaction fees is permanently removed from circulation
- **Supply Reduction:** This continual burning creates positive pressure on token economics as network usage increases
- **Sustainable Model:** The burn rate is carefully calibrated to balance ecosystem incentives with long-term value accrual

This burning mechanism provides a direct relationship between network usage and token value, creating a sustainable economic model that benefits long-term participants and supports the growth of the ecosystem.

Incentive Structure

Beyond basic utility, Neura employs innovative social mechanisms to drive community engagement and on-chain activity:

- **Points System:** A comprehensive rewards program that tracks positive contributions to the ecosystem, from development activity to transaction volume
- **Leaderboards & Gamification:** Competitive elements that showcase top participants across various categories, driving increased participation
- **Developer Incentives:** Focused rewards for teams building on Neura, especially those creating AI and DeFi applications
- **Liquidity Rewards:** Programs designed to attract and retain liquidity providers across the ecosystem

The points system creates non-financial incentives that complement direct token rewards, building community while encouraging beneficial network behavior. These incentives are specifically designed to cultivate the types of applications and user behaviors that will drive long-term ecosystem health.

Staking Ecosystem Integration

Leveraging Ankr's established staking infrastructure[3] provides additional advantages:

- **Staking Products:** Existing ANKR staking and liquid staking solutions offer a secondary layer of liquidity that further supports DeFi
- **Cross-Chain Integration:** Liquid staked assets from other blockchains can interact with the Neura ecosystem
- **Validator Backing:** Institutional-grade staking services provide rewards for those who back network validators

This integration of ANKR's broader staking ecosystem creates synergies that benefit both the token and the Neura network, providing enhanced liquidity from day one.

Together, these economic components create a robust foundation for Neura, leveraging ANKR's existing market presence and utility while introducing new mechanisms that drive network growth and token value alignment.

3 https://www.ankr.com/staking/stake/

4. AI & DeFi Applications

Neura is optimized for next-generation applications at the intersection of AI and DeFi, aiming to onboard users of any technical background. The platform's technical capabilities and economic model support innovative use cases that require high performance, low transaction costs, and a forward-looking approach to providing the data and compute of tomorrow's agents and algorithms.

Custom MCP Servers

An MCP (Model Context Protocol) server is a standardized interface that enables AI models, particularly large language models (LLMs), to interact with external data sources, tools, and services in a secure and flexible manner. It acts as a bridge between an AI system and the outside world, allowing the AI to access real-time information, perform actions, or query resources without requiring custom integrations for each new tool or data source.

Neura's infrastructure and validators will perform the dual role of maintaining consensus and allowing agents to query blockchain data in real time. Neura is able to leverage Ankr's global RPC network to provide real-time and verifiable multichain metrics. These custom integrations enable data querying at the speed of block production ensuring agents operating on the Neura stack can leverage both the speed and security of Neura to conduct onchain operations.

AI-Powered Validators

Neura introduces a novel integration of agentic AI at the validator level:

- **Interactive AI Validator Agents:** Each validator node is paired with an AI agent that monitors network health, reports on transaction patterns, and provides real-time analytics about blockchain activity
- **Personalized Network Experience:** Users can interact with the agents to receive customized information about network conditions, gas price recommendations, and transaction optimizations
- **Enhanced Network Intelligence:** The collective insights from these agents create a transparent view of network health and user behavior, helping developers optimize their applications and users make informed decisions.

This validator-level AI integration brings a new dimension to blockchain interaction, turning the underlying infrastructure into an intelligent, responsive system that drives community and enhances the user experience. This is just one example of how Neura will set the stage for builders and end-users in DeFAI.

Enhanced User and Agent Experience

Neura will implement features to improve user and agent experience for any application use case:

- **Smart Wallets:** A secure and streamlined user onboarding experience to eliminate technical barriers and increase user adoption
- **Gasless Transactions:** Applications can cover gas costs for their users, eliminating a major friction point for blockchain adoption
- **AI Agent Launchpad:** A framework provided to easily launch customizable onchain agents with wallet capabilities
- **Bundled Operations:** Complex multi-step processes can be executed in a single click, simplifying the user and agent transaction experience
- **Multi-Token Gas Payments:** If required, users can pay transaction fees with tokens other than ANKR, removing the need to hold multiple currencies

These features make interactions with Neura more accessible to users regardless of their familiarity with blockchain technology, expanding the potential audience for applications built on the platform.

Through the combination of innovative applications, developer support, and user experience enhancements, Neura creates a fertile environment for experimentation and growth at the cutting edge of AI and DeFi integration.

5. Security Model

Neura implements a comprehensive security framework designed to safeguard network integrity, user assets, and ecosystem stability. By combining rigorous validation processes, economic incentives, and proactive threat mitigation, the platform establishes a foundation of trust essential for a high-value blockchain network.

Auditing Approach

Security at Neura begins with a thorough validation of all system components:

- **Comprehensive Third-Party Audits:** Core smart contracts, consensus mechanisms, and network infrastructure undergo independent security audits by industry-leading firms before mainnet deployment
- **Continuous Security Monitoring:** Ongoing surveillance of network activity for anomalous patterns or potential vulnerabilities
- **Bug Bounty Program:** Competitive rewards for ethical hackers who identify and responsibly disclose potential security issues, leveraging community expertise to strengthen the platform
- **Formal Verification:** Critical system components undergo mathematical verification to prove correctness and eliminate entire classes of potential vulnerabilities

This multi-layered validation approach ensures that security is embedded in every aspect of Neura's design and operation, from core infrastructure to application interfaces.

Risk Mitigation Strategies

Neura employs proactive strategies to address common blockchain threats:

- **DDoS Protection:** Advanced network infrastructure with distributed points of presence and traffic filtering to mitigate denial of service attacks
- **Upgrade Safeguards:** Controlled upgrade processes with multiple validation stages to prevent the introduction of vulnerabilities during protocol evolution
- **Validator Diversity:** Geographic and operational diversity in the validator set to eliminate single points of failure

In addition to these preventative measures, Neura maintains detailed incident response procedures for rapid coordination in the unlikely event of a security incident.

Security Governance

The Neura ecosystem approaches security as an ongoing governance priority:

- **Security Council:** A specialized group overseeing network security with authority to implement emergency measures when necessary

- **Transparent Disclosure:** Clear communication protocols for security updates and incident reporting
- **Regular Security Reviews:** Scheduled reassessments of security posture as the network evolves
- **Distributed Governance:** Neura will progressively be decentralized through a phased approach that gradually expands the validator set

This governance approach ensures that security remains a primary consideration throughout the network's lifetime, adapting to new threats and technologies as they emerge.

Through this comprehensive security model, Neura creates a robust foundation that protects users and applications while enabling the innovation and experimentation that drive blockchain adoption.

6. Conclusion

Neura is designed to be the optimal platform for innovation in AI and DeFi, providing a specialized environment where performance meets composability and extensibility. By delivering sub-second block times with instant finality while maintaining 100% EVM compatibility and cross-chain interoperability, Neura eliminates many trade-offs that have continued to constrain developers on other networks. This technical foundation, combined with the economic utility of the ANKR token and backed by Ankr's proven infrastructure expertise, creates a uniquely powerful environment for next-generation applications.

The platform's careful balance of security, performance, and usability makes it particularly suited for projects requiring high-throughput, responsive infrastructure with low and predictable costs. For AI developers seeking an on-chain ecosystem built to deliver context, DeFi builders integrating the best-in-class yield management tooling, or existing teams looking to scale their operations, Neura provides the ideal environment to build, test, and deploy innovative solutions that push the boundaries of what's possible.

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