Endless Web3 Genesis Cloud

White Paper

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Content

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Abstract

Endless Web3 Genesis Cloud is the world's first distributed cloud intelligence component protocol, integrating technical solutions such as AI, serverless architecture, fully distributed networks, relay mechanisms, multiple SDKs, and APIs. It enables developers to rapidly and seamlessly build Web3 decentralized applications (DApps) using any programming language while delivering a user experience comparable to Web2 applications. Endless Web3 Genesis Cloud serves as a Web3 cloud service platform that truly guarantees user privacy, virtual asset security, and data sovereignty. It provides comprehensive technical support for application developers, ranging from smart contract development, decentralized storage, and modular component construction to information security and privacy protection. By lowering the technical barrier for transitioning from Web2 to Web3, it significantly enhances the Web3 user experience.

This white paper will provide a detailed exposition of the market positioning, commercial value, ecosystem structure, and future development strategy of Endless Web3 Genesis Cloud, along with its potential impact on the Web3 industry. Through an in-depth analysis of its core functionalities and technological advantages, this paper aims to offer comprehensive and insightful perspectives to developers, investors, and partners.

Introduction

In recent years, Web3 has demonstrated strong growth momentum. Although mainstream blockchain platforms have driven the widespread adoption of decentralized technologies, their ecosystems have gradually evolved into hotbeds for financial products and speculative activities. These platforms were originally intended to uphold the core vision of Web3. However, an increasing number of projects are focusing on short-term financial maneuvers, relying on market speculation to attract attention and capital inflows, while neglecting the fundamental mission of technology—to empower users, protect privacy, ensure security, and uphold the core values of decentralization.

The true innovation of Web3 should center around enhancing user experience, safeguarding user privacy, and ensuring user control over their own data, while also creating new economic opportunities. However, most projects in the current market prioritize short-term capital returns rather than addressing these fundamental issues. Many Web3 projects are, in essence, mere variations of financial products that fail to truly enhance user value or contribute to the sustainable development of the decentralized ecosystem.

The original intent of Web3 should not be confined to financial applications. Instead, it should leverage technological innovation to grant users greater autonomy, ensure data privacy and security, and establish a decentralized co-creation economy where users can generate and enjoy the value they deserve. Therefore,

there is an urgent need for a new protocol that truly embodies the core vision and foundational principles of Web3.

The creation of Endless Web3 Genesis Cloud is precisely aimed at achieving this goal. By building a highly flexible, privacy-preserving, and data-secure decentralized development platform, Genesis Cloud significantly lowers the technical barrier for developers entering Web3, facilitates the seamless migration of Web2 applications to Web3, and, through its innovative technical architecture, supports diverse application scenarios that extend beyond financial products to deliver real-world value to the Web3 ecosystem.

The decentralized technology platform constructed by Genesis Cloud provides end users with comprehensive privacy protection, data sovereignty assurance, and a collaborative value-creation environment. At the same time, it significantly reduces the entry barriers for ordinary users to engage with Web3 applications, enabling them to transition seamlessly from Web2 to the Web3 ecosystem.

As Genesis Cloud continues to expand and gain widespread adoption, the Web3 ecosystem is expected to return to its original vision—achieving genuine user empowerment and value co-creation. Only when users receive tangible privacy protection, data sovereignty, and economic participation rights can Web3's full potential be realized, thereby stimulating user-driven value creation and propelling the next wave of growth in the digital economy.

1 Project Overview

1.1 Project Introduction

Endless Web3 Genesis Cloud provides a secure, privacy-first, and decentralized environment, laying the foundation for a rich Web3 ecosystem while enabling users to collaboratively participate in the economic system and share in its value.

The core philosophy of Genesis Cloud is co-creation. By leveraging efficient decentralized components, it establishes a highly flexible and user-friendly development platform. It integrates AI, serverless architecture, fully distributed networks, relay mechanisms, multiple SDKs, and APIs to lower the technological barrier for developers entering the Web3 space. Utilizing decentralized networks, distributed storage, smart contracts, zero-knowledge proofs, and cross-chain technologies, Genesis Cloud ensures the security of data assets and privacy protection. Furthermore, through its innovative architectural design, it supports a diverse range of application scenarios.

In the co-creation economic ecosystem of Genesis Cloud, users (community members) are no longer passive consumers or speculative targets of financial markets; instead, they become active contributors and beneficiaries. Users can create value by generating content, providing services, and participating in community governance, and they can be rewarded within the ecosystem through a token-based economic model. Compared with traditional Web2 systems, Genesis Cloud

transforms users from being mere ”products” into true partners of the ecosystem. In contrast to existing Web3 infrastructure, Genesis Cloud focuses more on practical value applications, achieving genuine economic value creation for users.

1.2 Project Vision

The vision of Endless Web3 Genesis Cloud is to leverage an innovative decentralized technology platform to realize true user empowerment and value co-creation. It aims to enable Web3 applications that provide tangible user benefits, allowing users to collectively partake in the value creation and distribution of the digital economy, thereby fostering the prosperity of the Web3 ecosystem.

Genesis Cloud is committed to transforming users from passive consumers of Web2 internet products into active contributors, driving decentralized value co-creation, and promoting the evolution of the Web3 ecosystem from speculative financial products to applications with real-world value. In addition to supporting diverse application models, Genesis Cloud actively advances the implementation of privacy and security technology standards, ensuring that users retain data autonomy and asset ownership within the digital economy.

2 Industry Background and Market Challenges

2.1 Industry Status and Trends

In recent years, the cryptocurrency market has experienced significant growth, drawing widespread attention due to its expanding market size and development potential. According to the latest research, as of October 2024, the total market capitalization of the global cryptocurrency market has reached $2.5 trillion, encompassing tens of thousands of crypto assets, demonstrating the market's vast scope and diversity.

2.1.1 Market Size and Growth Potential

According to the latest *State of Crypto 2024* report published by a16z, the estimated number of globally active monthly cryptocurrency users ranges between 30 million and 60 million. This figure represents only 5% to 10% of the 617 million total global cryptocurrency holders estimated by Crypto.com as of June 2024. The number of active on-chain addresses per month has surged to a record high of 220 million, a growth trajectory reminiscent of the early days of the internet.

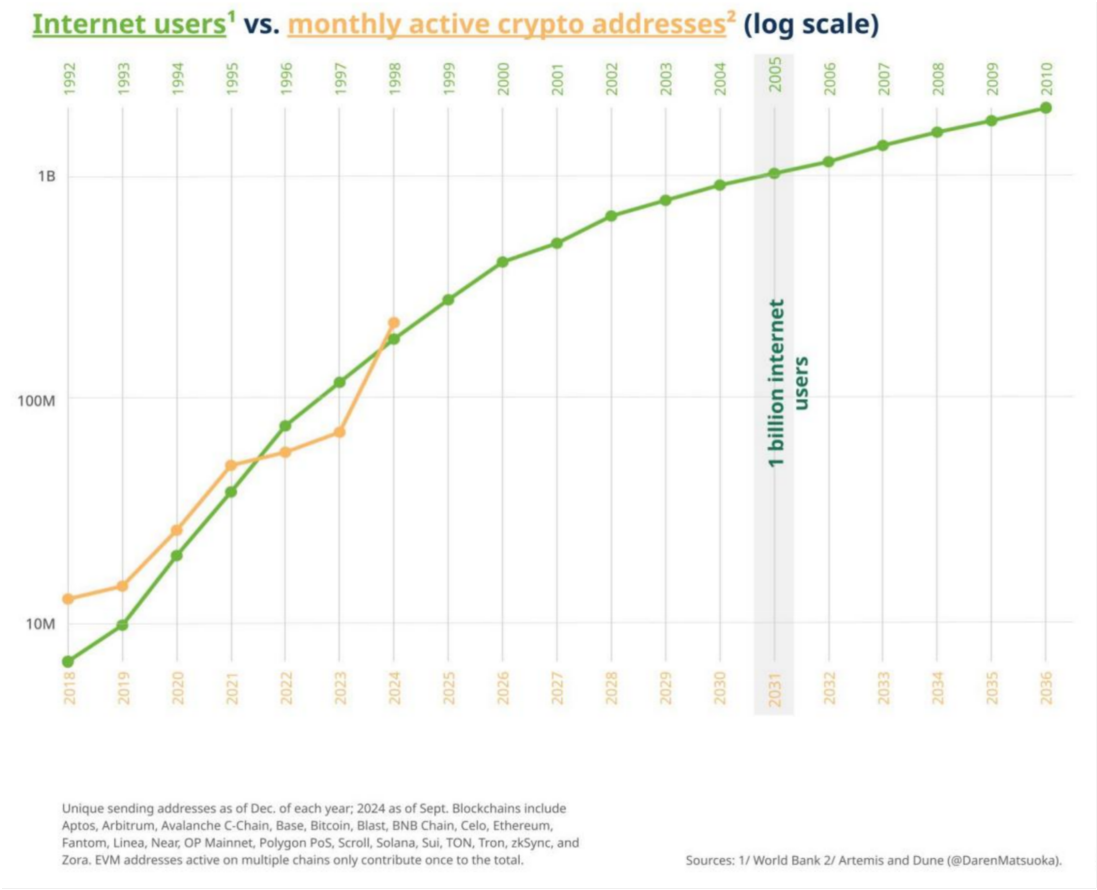

Figure 2.1: Internet Users vs. Monthly Active Crypto Addresses (Logarithmic Scale)

This gap presents a significant opportunity to attract and re-engage passive cryptocurrency holders. With major advancements in infrastructure enabling the development of new, engaging applications and innovative user experiences, more dormant crypto holders may transition into active on-chain participants.

The growth potential of the cryptocurrency market is primarily reflected in the following aspects. First, institutional participation is steadily increasing, driving greater market adoption. Traditional financial institutions are accelerating their entry into the crypto market—for example, asset management firms

are launching crypto investment products, banks are offering crypto custody services, payment giants are integrating cryptocurrency transaction solutions, publicly traded companies are adding Bitcoin to their balance sheets, and sovereign wealth funds are beginning to allocate crypto assets. The influx of institutional capital not only provides financial support to the market but also enhances overall stability and transparency.

Second, the rise of decentralized finance (DeFi) and stablecoins has introduced new application scenarios and growth opportunities for the cryptocurrency market. Stablecoins are increasingly used in payments and transactions, further expanding the market and fueling the development of DeFi, NFTs, blockchain gaming, decentralized social platforms (SocialFi), decentralized payments (PayFi), decentralized physical infrastructure networks (DePin), and AI Agents.

Endless, with its low-barrier design and modular components, is poised to become a key driver of widespread adoption in the market, attracting extensive participation from developers, project teams, and end users.

The global developer market also holds enormous potential. To date, more than 27 million developers exist worldwide, with most of them being Web2 developers. As blockchain technology continues to gain mainstream adoption, an increasing number of Web2 developers are expected to transition to the Web3 space by 2025. Endless facilitates this transition through simplified development tools and cross-platform compatibility, effectively empowering Web2 developers to enter the Web3 ecosystem and contributing to overall market expansion.

Additionally, with ongoing technological advancements and improving regulatory frameworks, more investors are beginning to pay close attention to the cryptocurrency market. Although the sector still faces volatility and compliance challenges, the long-term outlook for the crypto market remains positive. Investors can capitalize on potential opportunities by staying informed about

evolving market trends and technological innovations.

2.1.2 Technological Trends and Market Demand

Traditional centralized networks (Web2) have connected billions of people to the internet and built a stable and reliable digital infrastructure. However, the internet ecosystem has gradually become dominated by a few centralized giants, resulting in excessive data control concentration and even monopolistic governance structures. Web3 offers a new opportunity to break this deadlock. Unlike the traditional internet dominated by technology giants, Web3 is centered around decentralization, enabling all users to collaboratively build, operate, and own internet resources. It aims to shift power from centralized institutions to individual users. Web3 has evolved into a broadly encompassing concept representing a new generation and a more equitable vision of the internet. Its core objective is to empower users through ownership mechanisms enabled by blockchain, cryptocurrency, and non-fungible tokens (NFTs), thereby redefining digital rights and ownership.

Currently, Web3 technologies are primarily applied in areas such as smart contracts, decentralized storage, cross-chain solutions, decentralized identity (DID), the convergence of artificial intelligence (AI) and Web3, and zero-knowledge proofs (ZKP). The continuous innovation in these technologies not only accelerates the growth of Web3 but also stimulates new market demand, opening up vast opportunities for the industry.

1 Decentralized Storage

Decentralized storage technologies (such as IPFS and Arweave) offer a new paradigm for data storage, ensuring data security, privacy, and high availability while avoiding the single point of failure risks inherent in traditional centralized

storage systems. With the exponential growth of global data volumes and the increasing emphasis on data privacy protection, decentralized storage is gradually gaining attention from enterprises and individual users alike. The market urgently requires secure and privacy-preserving storage solutions to guarantee data integrity and long-term reliability.

2 Zero-Knowledge Proofs

Zero-knowledge proof (ZKP) technology is a cryptographic method that enables the verification of information authenticity without revealing specific data content. It has become a critical tool for privacy protection and secure verification. As concerns over data breaches and privacy violations continue to escalate, users' need for personal information protection is growing. ZKP technology provides a powerful security mechanism for Web3 applications by ensuring both verifiability and privacy.

3 Cross-Chain Technology

The primary goal of cross-chain technology is to address interoperability issues between different blockchain networks, allowing seamless asset and data transfers across multiple chains. As blockchain ecosystems become more diverse, the "information silos" between different public chains and application chains have become increasingly evident. Both users and developers urgently require efficient cross-chain solutions that facilitate asset transfers, data sharing, and multi-chain cooperative computing, thereby enhancing the usability of Web3 applications.

4 The Convergence of AI and Web3

The integration of artificial intelligence (AI) and Web3 is driving the next wave of technological innovation. AI can be deeply embedded into smart con-

tracts to optimize decentralized application (DApp) user experiences and provide more precise data analysis and personalized services. With the increasing demand for intelligent and personalized applications, users expect more efficient and intelligent interactions within the Web3 ecosystem. By incorporating AI, Endless enhances the intelligence of its platform, empowering decentralized product development and delivering superior personalized services and operational efficiency to users.

5 The Impact of Technological Fragmentation

The rapid development and continuous emergence of innovations within the Web3 space have led to a highly fragmented technology landscape. While this diverse ecosystem drives industry innovation, it also presents challenges in terms of standardization and interoperability. Developers face compatibility challenges between different technical standards and protocols, while users may encounter barriers when navigating across platforms due to operational differences. Balancing technological diversity with interoperability has become a key issue in advancing the Web3 ecosystem.

Web3 technology is more than just an iteration of technical advancements—it also serves as a catalyst for the digital transformation of traditional industries. The evolution of Web3 technologies and increasing market demand are guiding multiple traditional sectors through profound transformations. In this context, businesses must proactively embrace the Web3 ecosystem to maintain competitive advantages and align with market developments. The Web2.5 phase represents a critical transitional period, where enterprises can explore the practical value of Web3 technologies to achieve a smooth migration from centralized architecture to decentralized models, adapting to the demands of the digital economy era.

Endless is committed to delivering innovative solutions within the Web3

ecosystem. With its modular architecture and low-barrier design, it provides robust support for users, developers, and enterprises/projects. Endless' technology stack encompasses decentralized storage, cross-chain interoperability, privacy protection, and AI optimization, offering extensive applications in the Web3 ecosystem. By lowering the technological entry barriers and enhancing infrastructure usability, Endless is well-positioned to drive the large-scale adoption of Web3 technologies, facilitating a seamless transition for developers and enterprises into the decentralized era.

2.2 Market Challenges

2.2.1 High Development Barriers

The Web3 development environment presents significant technical barriers for traditional Web2 developers, requiring them to gain an in-depth understanding of blockchain fundamentals such as distributed ledgers, smart contract programming, and decentralized application (DApp) deployment. These technologies differ substantially from the centralized architecture and technical logic of Web2 development, making the transition process challenging due to a steep learning curve.

For instance, developers need to master smart contract programming languages such as Solidity and familiarize themselves with the operational mechanisms of blockchain platforms like Ethereum. In contrast, programmers developing for Web2 primarily use languages like JavaScript and Python, making smart contract development require considerable time and effort to adapt to the new programming paradigms and toolchains. Moreover, Web3 enforces a decentralized architecture that differs entirely from traditional centralized server-based models, further increasing development complexity.

2.2.2 Data Privacy and Security Challenges

Although Web3 technology theoretically enhances data privacy and security, it still exhibits numerous shortcomings in real-world applications. Security vulnerabilities in smart contracts and improper private key management can lead to data breaches or asset losses. Existing Web3 platforms still have deficiencies in privacy protection and security measures, leading to skepticism among investors and users regarding their ability to safeguard sensitive information. For example, the DAO hack in 2017 resulted in millions of dollars in losses due to smart contract vulnerabilities exploited by hackers. Such incidents highlight the security weaknesses inherent in smart contracts and underscore the broader challenges facing data and asset protection in the Web3 ecosystem.

2.2.3 The Integration of AI and Web3 Remains in Early Stages

The convergence of artificial intelligence (AI) and Web3 holds immense potential, with applications spanning from smart contract optimization and data analytics to automated decision-making, offering significant innovations for the Web3 ecosystem. However, the integration of AI and Web3 is still in its nascent phase, with many potential use cases yet to be fully explored and implemented. For instance, AI has the potential to enhance the efficiency and security of smart contract execution, yet research and practical adoption in this area remain relatively undeveloped. Additionally, other AI-driven applications in Web3, such as personalized recommendations, automated trading, and intelligent governance, require further exploration and adoption to achieve widespread market penetration.

2.2.4 Technological Fragmentation and Interoperability Issues

The Web3 ecosystem lacks unified technical standards, leading to severe technological fragmentation that hinders interoperability between different blockchains and impedes cohesive industry development. Since various blockchain networks adopt their own technical protocols and architectural standards, cross-chain interactions are often complex and costly, limiting seamless experiences for users and developers in multi-chain environments. For instance, transferring assets between Ethereum and Polkadot is challenging due to their differing consensus mechanisms and technical frameworks. This lack of interoperability significantly restricts the adoption of decentralized applications (DApps) and negatively impacts user experience, posing a major obstacle to the large-scale expansion of the Web3 ecosystem.

2.2.5 Poor User Experience and a Limited Application Ecosystem

The current Web3 ecosystem has yet to achieve the level of seamless user experience seen in Web2 applications. For example, executing a simple transaction typically involves a complex process, such as calculating gas fees, selecting the appropriate network, and navigating technical intricacies—all of which create significant barriers for non-technical users. Moreover, the Web3 space suffers from a relatively limited and underdeveloped application ecosystem, offering fewer diverse and compelling use cases. This lack of variety reduces user options, hindering mass adoption and engagement, ultimately slowing down ecosystem growth and user retention.

3 Solutions and Core Value Proposition

Addressing the existing market pain points in the Web3 space, Endless presents a comprehensive solution through systemic technological innovation: leveraging decentralized storage architecture, zero-knowledge proof protocols, and cryptographic algorithms, it establishes a data sovereignty protection mechanism and a privacy-preserving system; employing modular component design and cross-platform compatibility to lower development barriers, while integrating a gas fee sponsorship mechanism to optimize user experience; utilizing a distributed computing framework to enhance system scalability, and supporting multi-chain ecosystem collaboration through cross-chain compatibility protocols; incorporating AI-powered decentralized applications to enable intelligent service upgrades. These innovations form Endless' core competitive advantage in the Web3 infrastructure space. For detailed technical architecture, refer to the *Endless Technical White Paper*.

3.1 Solution

3.1.1 Multi-Signature Account Security System

The on-chain multi-signature schemes used by mainstream blockchain platforms (such as Aptos and Sui) have certain technical limitations. These systems generate a fixed 32-byte authentication key (`auth_key`) at account creation and

rely on specific smart contract modules (such as Aptos' `0x1::multisig_account`) to implement multi-signature functionality, resulting in three core problems:

- **High Economic Cost**: Multi-signature transactions require frequent smart contract calls, significantly increasing gas consumption compared to regular transactions;
- **Complex Interaction Process**: Transaction confirmation involves multiple rounds of on-chain interactions, prolonging execution time;
- **Rigid Account Types**: Once an account type is created, it is locked, preventing dynamic switching between single-signature and multi-signature modes.

To address these issues, Endless restructures the multi-signature mechanism at the protocol layer, adopting a dynamic authentication key architecture to achieve key technological breakthroughs. The system allows the `auth_key` of any account to be configured with an address set ranging from 1 to 32:

- When the set contains only a single address, the account operates in single-signature mode;
- When the set contains multiple addresses, the account automatically transitions into multi-signature mode.

This architecture natively supports K-of-N threshold signature schemes, enabling users to dynamically manage the address set via command-line tools or dedicated DApps, allowing instant switching between single-signature and multi-signature modes.

Compared to conventional on-chain contract-driven multi-signature solutions, Endless' native multi-signature mechanism offers three key advantages:

- **Reduced Gas Costs**: Since signature verification logic is directly embedded in the protocol layer, multi-signature transactions consume the same gas as single-signature transactions;
- **Optimized User Experience**: By integrating with a visualized DApp (such as the Endless Multisig DApp), the system simplifies multi-signature account creation and management, reducing operational complexity;
- **Enhanced Security**: The distributed permission management architecture prevents single-point control risks, ensuring that all transactions must meet predefined multi-signature thresholds, effectively establishing a decentralized asset protection mechanism.

This technological innovation not only addresses existing blockchain platforms' challenges in multi-signature account management but also provides a more secure, flexible, and efficient multi-signature account solution for the Web3 ecosystem. Moving forward, Endless will continue optimizing its protocol-layer identity management mechanisms to promote the widespread adoption of multi-signature accounts in DeFi, DAO governance, enterprise blockchain applications, and beyond.

3.1.2 Enhanced Account Address System

Endless Blockchain adopts an optimized Base58 encoding scheme to build its account address system, improving user operability while ensuring cryptographic security. The generated addresses typically have a length of 43-44 characters and incorporate specific leading and trailing character patterns for quick classification and validation. Additionally, Endless allows users to create vanity addresses with customized character combinations to meet personalized requirements. However, to ensure transaction security, users must verify the full address sequence when

executing critical operations to avoid misoperations caused by partial character matches.

This address system has been deeply integrated into key tools and applications within the Endless ecosystem, including:

- **Command Line Interface (CLI)**: Supports the generation, verification, and management of account addresses, allowing developers to efficiently debug and maintain their systems.
- **Blockchain Explorer**: Provides visual address resolution, intuitively displaying transaction-related addresses, interaction history, and other on-chain data.

From a technical perspective, each account address fundamentally corresponds to a 32-byte data structure and is represented in hexadecimal format within system-level interactions to align with blockchain' s underlying data structures. For example, core system accounts adopt standardized hexadecimal shorthand representations:

- **0x1**: System contract execution account, responsible for blockchain protocol updates and smart contract deployment.
- **0x4**: Digital asset management account, overseeing the issuance and circulation of fungible tokens (FTs) and non-fungible tokens (NFTs).

The Endless account address system integrates Base58 encoding with hexadecimal identifiers to accommodate different usage scenarios:

- **Improved User Experience**: Base58 encoding eliminates easily confusable characters (such as 0 and O), reducing input errors.

- **Enhanced Developer Efficiency**: The hexadecimal format aligns with blockchain' s underlying storage needs, facilitating smart contract and system-level interactions.

By flexibly adapting to different interaction scenarios, Endless has constructed a secure, user-friendly, and technically precise account management system, providing an efficient and accessible identity framework for the Web3 ecosystem.

3.1.3 Keyless Authentication System

Endless has innovatively built a keyless account system based on the OpenID Connect (OIDC) protocol, redefining the Web3 user authentication paradigm. This solution integrates mainstream social authentication services (such as Google and Apple), seamlessly bridging the Web2 account system with blockchain accounts. Users can access and authenticate across devices without managing private keys or mnemonic phrases. The core value of this approach lies in transforming complex key management into a familiar identity authentication process while ensuring account security and recoverability with a distributed key management protocol.

From a technical perspective, Endless adopts a zero-knowledge proof (ZKP) architecture to map OIDC identity credentials into on-chain verifiable claims. Each keyless account is uniquely determined by the following triplet:

- **OIDC Provider** (e.g., Google, Apple)
- **Service Provider** (including wallets or DApps)
- **User Identifier** (e.g., email, username)

This design maintains the decentralization of the account generation process while being compatible with existing internet identity authentication systems. Additionally, to prevent cross-platform identity leakage, Endless employs a strict identity isolation mechanism, ensuring that accounts created under different service providers remain independent, thereby mitigating identity correlation risks.

To address the security concerns of traditional private key management, Endless implements a dual-security enhancement strategy:

- **Distributed Key Custody**: Utilizing Hardware Security Modules (HSMs) to decentralize key material storage, ensuring that user identity credentials and on-chain operational permissions remain fully decoupled, thereby reducing key exposure risks.
- **Multi-Signature Fault Tolerance**: By integrating multi-signature account architecture, users can still authorize transactions via predefined distributed verification nodes even if an OIDC identity provider experiences temporary failures, preventing account access disruptions.

This architecture not only eliminates single points of failure but also significantly optimizes account recovery processes—users can fully restore account control on any new device simply by re-verifying through their original authentication channel, with no need for additional security credentials.

Endless' keyless identity system strikes an optimal balance between security and usability:

- **Developer-Friendly**: Provides standardized APIs that allow developers to quickly integrate keyless login functionality, reducing the authentication development barriers for DApps.
- **Enhanced User Experience**: End-users enjoy a seamless login experience

akin to Web2 services, eliminating the need to manage complex mnemonic phrases or private keys.

By offloading key management complexity to the protocol layer, Endless provides a scalable, secure, and user-friendly authentication solution for the Web3 ecosystem. This innovation marks a significant step toward mainstream internet user adoption of Web3, laying a solid foundation for large-scale blockchain applications.

3.1.4 Traffic-Driven Consensus Model

Endless Blockchain innovatively transforms network traffic resources into programmable value carriers, constructing a protocol bridge between the physical network layer and the digital asset layer. This system is built upon a three-tier collaborative architecture that redefines cloud service metering:

- **Embedded Data Collection**: Atomically records network resource consumption, ensuring data completeness and verifiability.
- **Distributed Verification Network**: Establishes data ownership and value encapsulation to ensure the trustworthy computation and attestation of traffic resources.
- **On-Chain Smart Contract Engine**: Executes precise settlements and ecosystem incentives, building a scalable traffic value system.

This architecture covers the full process of "metering-verification-circulation," enabling network traffic to become a tradable digital asset and promoting the deep integration of blockchain and cloud computing.

Client-Side SDK: The Frontline of Data Collection

The client-side SDK is developed using memory-safe Rust language, creating a trusted execution environment while integrating dual protection mechanisms of control flow obfuscation and symbolic encryption. Core functionalities include:

- Real-time capture of bidirectional network traffic with each data unit cryptographically signed using the BLS12-381 signature algorithm, ensuring temporal and spatial binding.
- Employing an anti-reverse-engineering design to maintain encrypted key material isolation even if a device is compromised.
- Implementing a time-slicing submission strategy that periodically pushes signed traffic snapshots to the verification network, balancing real-time performance while minimizing system overhead.

Signature Network: The Hub for Data Verification and Aggregation

A globally distributed decentralized signature network establishes a trusted auditing framework, with each node running a lightweight BLS verification protocol to perform parallel signature validation on large-scale traffic records. Key features include:

- Utilizing threshold signature technology to compress millions of signatures into a constant-sized aggregated proof, significantly improving on-chain data processing efficiency.
- Maintaining a spatiotemporal database to store historical traffic fingerprints, enabling millisecond-level data traceability and minute-level audit report generation.

- Providing an open API for cloud service providers, supporting multi-dimensional queries of resource usage patterns to facilitate settlement and data analytics.

Blockchain Smart Contracts: The Impartial Arbitrator of Automated Settlements

The on-chain settlement contract employs a modular architecture and automatically triggers multi-stage validation upon receiving an aggregated proof:

- Verifies the mathematical integrity of BLS signatures while checking the validity of the source via the device fingerprint database.
- Computes resource discounts based on real-time market indices to ensure fair billing and settlement.
- Automatically settles traffic fees according to predefined rules, directly transferring payments to cloud service providers without the need for human intervention.
- A future enhancement may introduce a delayed activation mechanism, establishing a dispute period to handle abnormal data claims and safeguard the fairness of settlements.

Through this innovative consensus model, Endless not only transforms network traffic into an asset class but also drives the broad application of blockchain in cloud computing metering and resource management.

3.1.5 Consensus Model Based on Storage Resources

Endless adopts a verifiable proof-of-storage mechanism based on cryptographic commitments and the challenge-response protocol, establishing an effi-

cient and secure decentralized storage consensus system. This model leverages the immutability of blockchain to ensure the integrity and auditability of stored data. The core process is as follows:

1. **File Upload (Files to Provider)**: Users encrypt and shard files before submitting them to storage providers (such as decentralized storage nodes or cloud storage services).

2. **Metadata Generation (Metadatas to User)**: The storage provider generates metadata for the file (including hash values, storage locations, timestamps, etc.) and returns it to the user to ensure verifiability.

3. **Digital Signature Binding (Signatures)**: The storage provider signs the metadata using digital signature algorithms (such as ECDSA) to prove data ownership, integrity, and storage accountability.

4. **Cryptographic Commitment Generation (Commitment)**: The storage provider uses advanced cryptographic techniques (such as KZG polynomial commitments) to compute the proof of storage and write it to the blockchain, ensuring data storage is non-repudiable.

5. **Challenge Mechanism (Challenge)**: The blockchain network or user can periodically issue random challenges, requiring the storage provider to prove it still holds the complete data, preventing data loss or malicious deletion.

6. **Proof Generation (Proof)**: In response to a challenge request, the storage provider computes a proof of storage and submits it to the blockchain for verification, ensuring data availability.

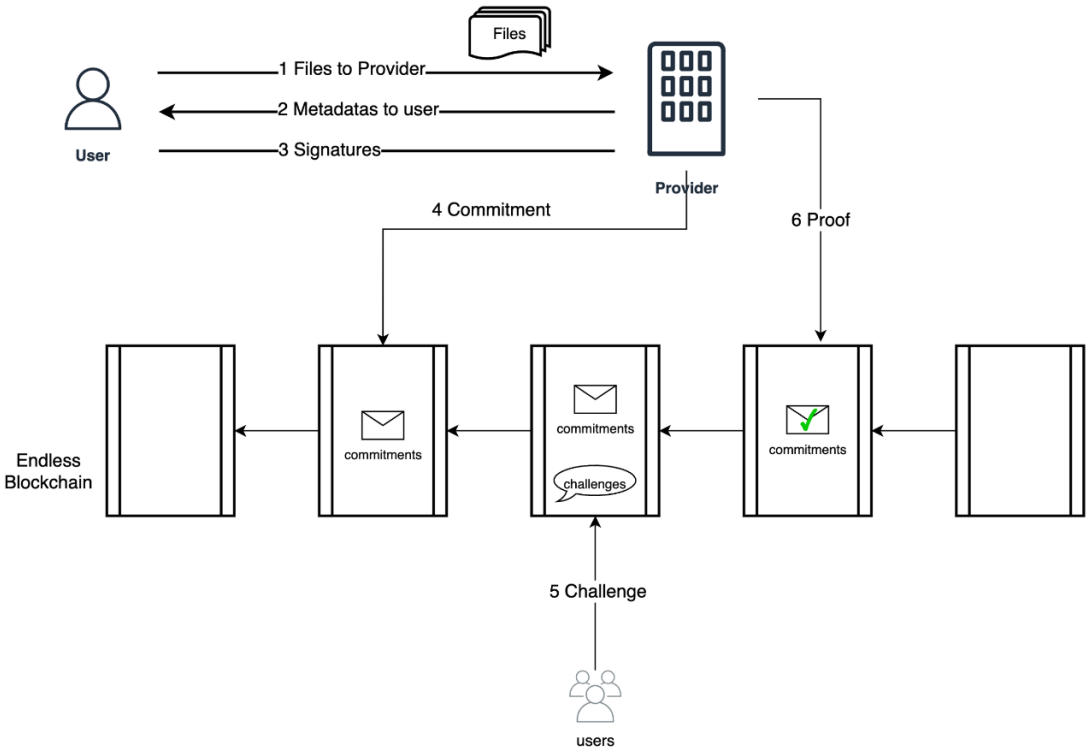

Figure 3.1: Consensus Model Based on Storage Resources

This consensus model not only ensures the honesty of storage providers and the credibility of storage proofs but also supports the effective economic incentives of decentralized storage services, building an efficient and auditable data storage infrastructure for the Web3 ecosystem.

3.1.6 Endless Chain Consensus Model

Endless adopts a hybrid consensus architecture that combines Byzantine Fault Tolerance (BFT) and Proof-of-Stake (PoS) mechanisms to enhance the security, decentralization, and transaction throughput of the blockchain network.

BFT Consensus Mechanism

- **Validator Cluster Architecture**: The network consists of a dynamic set of validators that employ an improved BFT algorithm to ensure transaction ordering and final state confirmation, enhancing resilience against Byzantine attacks.
- **Stake-Weighted Voting**: The voting weight of validators in the consensus process is proportional to their staked tokens, allowing token holders to participate in network governance through delegated staking.
- **Node State Management**: Validator nodes can be in either an active or inactive state, with the system periodically monitoring node status to maintain network stability and continuous operation.

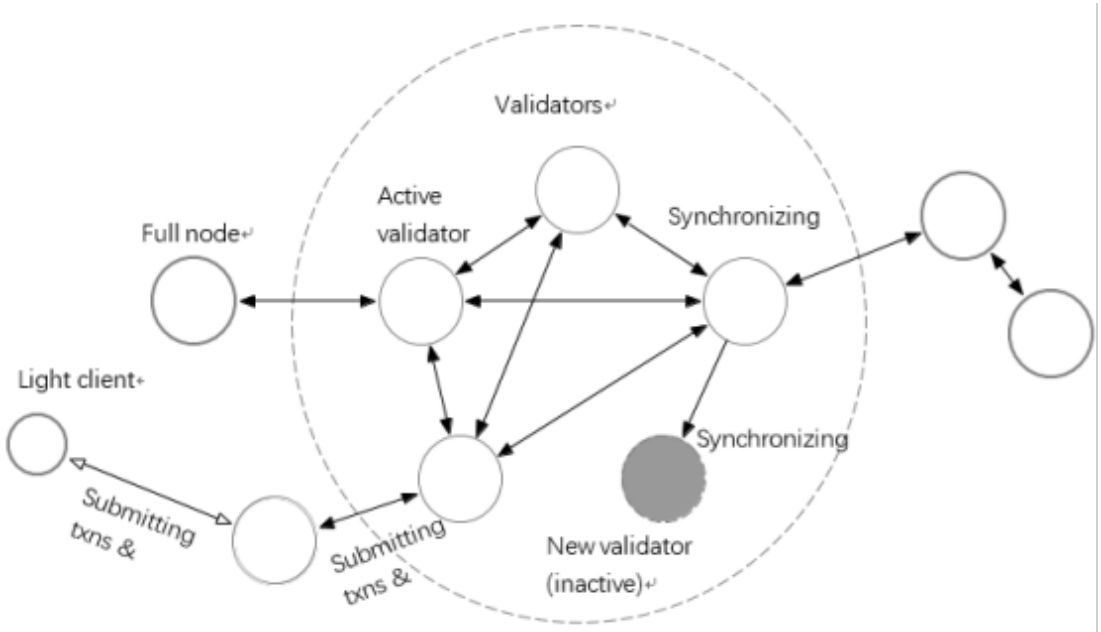

Figure 3.2: Endless Chain Consensus Model

PoS Consensus Mechanism

- **Staking Economic System**: Validators must stake a minimum threshold amount of EDS tokens to participate in transaction validation. The staked amount directly influences the $2f + 1$ weight threshold calculation in the BFT consensus. The selection of block proposers follows a probability distribution algorithm based on staking weight to enhance fairness within the network.

- **Reward Distribution Mechanism**: Stakers can freely delegate their stake to validators, with rewards distributed according to predefined smart contract rules. At the end of each epoch, on-chain automated settlement executes, requiring validators to disclose operational costs and reward distribution plans, ensuring governance transparency.

- **Dynamic Admission and Governance**: Key parameters such as the minimum staking requirement can be dynamically adjusted by the on-chain governance module. The admission of new validators is subject to verification by an on-chain reputation assessment contract, while abnormal validator removal rates are inversely proportional to the total network stake, ensuring a dynamic balance between fault tolerance and decentralization.

3.1.7 Asset Standards

Endless Chain establishes a unified asset standard to ensure the standardization, compatibility, and scalability of both fungible tokens (FTs) and non-fungible tokens (NFTs) on-chain. This standardized framework not only reduces the integration costs for developers but also enhances asset interoperability within the ecosystem.

Fungible Token (FT) Standard

Endless adopts the `FungibleAsset` standard, providing a unified interface for all fungible tokens (FTs) to enable efficient and standardized asset management. The core features include:

- **Standardized Interface**: Defines token metadata format, core APIs, and interaction protocols to ensure interoperability across smart contracts.
- **Compliance Checks**: Built-in compliance monitoring hooks that support automated policy enforcement, ensuring security and regulatory adherence.
- **Developer Tooling Support**:
  - Provides the `Endless CLI` command-line tool for one-click token deployment.
  - Integrates with the `TypeScript SDK`, enabling type-safe contract development and improving the developer experience.
  - Supports graphical interface-based token economy configuration, facilitating convenient adjustments to issuance rules and parameters.

Non-Fungible Token (NFT) Standard

Endless adopts the `DigitalAsset` standard, establishing a unified management framework for non-fungible tokens (NFTs) and other digital assets. Its core technical features include:

- **Multi-Function Minting Interface**: Provides a standardized minting API to ensure the unified management of digital assets.
- **Advanced Developer Tooling Support**:

  - Integrates with the `Endless CLI nft` subcommand for fast NFT deployment and management.
  - Provides a `TypeScript SDK` programming interface, allowing developers to flexibly extend NFT issuance functionalities.

- **Extended Functionality**: Supports the minting of soulbound NFTs, which are identity-bound and non-transferable assets.

By unifying the FT/NFT standards, Endless provides a flexible and scalable asset management solution for the Web3 ecosystem, enabling applications across decentralized finance (DeFi), gaming, digital collectibles, and on-chain identity frameworks.

3.1.8 Sponsored Transactions

In blockchain systems, users typically need to pay gas fees when executing transactions. For new users, developers, or certain decentralized applications (DApps), transaction fees can become a barrier to adoption and participation.

The sponsored transaction mechanism allows third parties to cover gas fees on behalf of users, reducing barriers to entry and optimizing the overall user experience. Some mainstream blockchains (such as Aptos) support third-party payment services (e.g., "Fuel Stations") that pay transaction fees on behalf of users in the background. However, these centralized fuel station solutions have critical drawbacks:

- **Centralized Dependency**: Fuel stations typically depend on a single-point server, meaning the service becomes unavailable if the server fails.

- **Single Point of Failure Risk**: Fuel stations can be targeted by attackers through DDoS attacks, disrupting user transactions.

- **Trust Issues**: Third parties must custody funds to cover gas fees, which may introduce financial security risks and potential misuse.

To address the centralization issues of traditional fuel stations, Endless implements a fully on-chain sponsored transaction mechanism, ensuring scalability and decentralization of the gas payment system. Its core operational mechanism is as follows:

- **Smart Contract-Based Gas Payment**: When a `Move` module implements the sponsorship function, any transactions invoking this function will have their gas fees deducted directly from the `Move` module account.
- **Decentralized Operation**: Without reliance on external servers, the sponsorship mechanism is entirely executed via on-chain smart contract logic, eliminating single points of failure.
- **Configurable Access Control**:
  - Supports on-chain whitelist/blacklist mechanisms to control invocation permissions for specific users or addresses.
  - Ensures module fund pool security, preventing malicious calls from depleting sponsored gas resources.

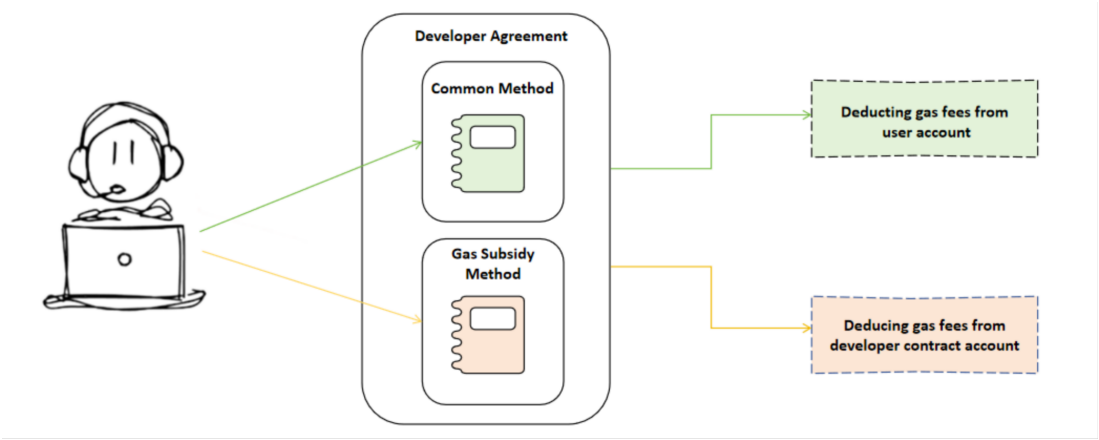

Figure 3.3: Illustration of Sponsored Gas Transactions

Compared to traditional centralized solutions, Endless' decentralized sponsored transaction mechanism offers greater robustness, fault tolerance, and security. In the future, this approach can be widely applied in Web3 user onboarding, DApp operational subsidies, and smart contract functionality promotion, further enhancing blockchain usability and adoption.

3.1.9 Indexer

The Endless Indexer serves as a core blockchain data infrastructure, providing essential query interfaces for address transaction histories, token details, NFT metadata, and more. Its technical architecture is optimized to meet the demands of high-speed blockchains, ensuring efficient and low-latency data querying capabilities.

- **Storage Engine**: Utilizes `RocksDB` as the underlying storage engine to efficiently store on-chain metadata. Additionally, it incorporates a chain-based Hook mechanism to support atomic indexing of transactional data.
- **Data Synchronization**: The indexer communicates with an Endless full

node using `Unix Domain Socket` in local environments, achieving microsecond-level latency. For remote environments, it employs the `gRPC` streaming protocol to ensure low-latency data synchronization.

Compared to the Aptos Indexer, the Endless Indexer demonstrates significant advantages in data synchronization speed, query efficiency, and disk space utilization.

Data Synchronization

In high-throughput (TPS) scenarios, database write performance is a key determinant of indexer synchronization efficiency. The Endless Indexer adopts RocksDB as its storage engine, leveraging the Log-Structured Merge Tree (LSM-Tree) architecture optimized for high-concurrency writes. In contrast, the Aptos Indexer relies on PostgreSQL, which, under rapid data growth, suffers from limited write throughput, potentially causing the indexer to lag behind full nodes by several hours. The Endless Indexer, however, maintains real-time synchronization even under high-load conditions, ensuring immediate availability of on-chain data.

Query Performance

Aptos Indexer uses a relational database (PostgreSQL), where query performance degrades as the data volume increases. The Endless Indexer, on the other hand, is built on a RocksDB-based key-value (KV) storage architecture, achieving a query complexity close to $\mathcal{O}(\log N)$. This ensures that, even as on-chain data continues to grow, query response times remain stable with minimal increase.

Storage Optimization

The Endless Indexer optimizes data storage using the LSM-Tree structure, significantly improving disk utilization compared to the relational database used by the Aptos Indexer. Benchmark tests indicate that the Endless Indexer reduces disk footprint by up to 99% relative to the Aptos Indexer, substantially lowering storage costs while enhancing data retrieval efficiency.

Despite its notable advantages in synchronization efficiency, query speed, and storage capacity, the Endless Indexer still has certain limitations in specific applications:

- **Limited Query Flexibility**: The Aptos Indexer supports GraphQL, enabling users to perform flexible searches based on complex query conditions. In contrast, the Endless Indexer employs a RESTful API-based query model, making queries comparatively less flexible.
- **Restricted Support for Complex Queries**: Since the Endless Indexer utilizes a KV storage model, its query structures are relatively fixed, making it difficult to support complex SQL statements and multi-table join queries, which may impose constraints in certain business scenarios.

3.1.10 Introduction of Token Locking Standard

Endless introduces a new system smart contract, `locking_coin_ex.move`, to manage token locking and distribution. This contract implements a locking and unlocking mechanism, ensuring the gradual release of tokens over a specified period, thereby optimizing token circulation control. Additionally, a `view` API is provided, allowing users to query the lock status of tokens at any time.

The token locking and release mechanism established by this contract enables all DApp projects leveraging it to manage token assets more efficiently,

transparently, and fairly. The contract offers the following functionalities:

- **Token Locking**: The contract allows administrators to lock tokens to specific addresses with a predetermined unlocking schedule. The locked tokens will be gradually released over the specified period.
- **Token Unlocking**: According to the configured release schedule, the contract automatically releases a predefined amount of tokens at the end of each unlock cycle.
- **Query Functionality**: Provides a rich set of query interfaces that allow users to view the total locked token amount, retrieve staking information for all participants, check the stake amount of specific participants, and review their unlock schedules.
- **Event Logging**: During token unlocking and claim processes, the contract records relevant events, facilitating future auditing and tracking.

The core design of this contract revolves around controlling the velocity of token circulation via a structured "locking" and "gradual release" mechanism. This approach mitigates the risk of excessive market fluctuations caused by the sudden release of large token volumes, thereby contributing to overall market stability.

3.1.11 Move Smart Contracts

Move is a new smart contract programming language that emphasizes security and flexibility. The Endless Blockchain leverages Move' s object model to represent ledger states and defines state transition rules through Move code (modules). When users submit transactions, they can deploy new modules, upgrade

existing ones, execute entry functions defined within modules, or run scripts that interact directly with public module interfaces.

The Move ecosystem consists of a compiler, virtual machine, and various development tools. Inspired by the Rust programming language, Move introduces linear types to enhance clarity in data ownership at the language level. Move upholds the scarcity, protection, and access control of resources, ensuring that assets such as tokens cannot be created without authorization, consumed multiple times, or lost unexpectedly.

To accommodate broader Web3 application scenarios, the Endless Blockchain implements fine-grained resource management, enabling parallel execution while providing near-constant cost control for data access and modification. Furthermore, Endless supports table-based fine-grained storage, allowing individual accounts to store large-scale datasets (e.g., massive NFT collections). Additionally, Endless enables fully on-chain defined shared and autonomous accounts, facilitating decentralized autonomous organizations (DAOs) to collaboratively manage shared accounts and use them as containers for heterogeneous resources.

Move Contract Modules

Move modules are composed of Move bytecode and primarily serve to declare data types (structures) and procedures. Each module is uniquely identified by the address that declares it and the module name.

Modules support on-chain dependencies, enabling code reuse. Typically, modules are grouped by addresses into packages, and package owners can publish entire packages (including bytecode and package metadata) on-chain. Package metadata determines whether a package is upgradeable or immutable. For upgradeable packages, compatibility checks must be performed before executing an upgrade: existing entry functions cannot be modified, stored resources cannot be

altered, but new functions and resources can be added.

The Endless framework consists of the Endless Blockchain' s core libraries and configurations, which are defined as standard upgradeable module packages.

Resources

Each account address can associate with data values, but only one instance of each type can exist. Different instantiations of generic types are treated as distinct types, providing excellent scalability. Rules for creating, deleting, and modifying data types are encoded within modules, with Move' s security mechanisms preventing unauthorized code from directly manipulating these data types.

Although each address may store only a single top-level value, this limitation can be circumvented via encapsulated data types. Additionally, not all data types can be stored on-chain—only data types with the necessary permissions (i.e., Key and Store capabilities) can be stored as top-level or nested values. Data types that possess both of these capabilities are typically referred to as "resources."

Execution and Security of Move Smart Contracts

The Endless Blockchain adopts the Move smart contract language and integrates it with a parallel execution framework to achieve secure and efficient contract execution. During Move contract execution, the virtual machine manages state updates and resource utilization, ensuring that execution does not result in state conflicts or resource leaks.

Every step of Move contract execution undergoes formal verification and static analysis to ensure adherence to predefined security guidelines. The Endless Blockchain employs a modular smart contract approach, allowing developers to flexibly extend and upgrade existing contracts without modifying underlying logic.

3.1.12 On-Chain Trusted Randomness

In blockchain systems, the trustworthiness and security of randomness are crucial, particularly for applications reliant on randomness, such as elections, lotteries, and gaming. The Endless Blockchain integrates a built-in trusted randomness generation mechanism, which enhances security while optimizing computational efficiency.

Endless adopts multiple cryptographic techniques to ensure that the randomness generation process remains fair, unpredictable, and tamper-proof:

- **Weighted Publicly Verifiable Secret Sharing (wPVSS) Algorithm**: Endless employs the wPVSS algorithm to enable validators to efficiently participate in the randomness generation process while reducing communication overhead and improving system performance.
- **Weighted Distributed Key Generation (wDKG) Protocol**: Endless integrates the wDKG protocol to further enhance the reliability of randomness generation, ensuring that the system remains secure in a decentralized environment.
- **Weighted Verifiable Random Function (wVRF)**: In each round of randomness generation, validators must evaluate wVRF to ensure the authenticity and security of the generated randomness. Furthermore, the communication cost of wVRF does not increase linearly with staked amounts, thereby optimizing network communication overhead.

The Endless Blockchain provides a randomness API that smart contracts can invoke to facilitate secure randomness generation. Utilizing these APIs, DApp developers can implement fair and trustworthy randomness mechanisms within

blockchain environments, enhancing the integrity and security of decentralized applications.

3.1.13 Decentralized Data Sovereignty Protection

Endless leverages distributed storage networks and node cluster architectures to systematically address the issues of data sovereignty loss and privacy breaches inherent in traditional centralized storage. Compared to traditional centralized storage, which is prone to single points of failure and data leakage risks, this solution offers the following technical advantages:

By adopting a decentralized storage architecture, data is fragmented and stored across geographically distributed nodes. This ensures that in the event of a node failure or attack, the system can rely on redundant backups across other nodes to fully restore data integrity. This design not only enhances data availability and security but also effectively reduces dependence on any single node.

The Endless decentralized storage system integrates a hybrid architecture that combines the InterPlanetary File System (IPFS) with key-value (KV) storage technology, providing a highly efficient, scalable, and secure distributed storage solution. This architecture utilizes data sharding algorithms and a geographic redundancy backup mechanism to meet decentralized applications' high-availability requirements for data storage across a global node network. Additionally, the system implements an end-to-end encryption framework, integrating AES-256 encryption standards and Shamir' s Secret Sharing (SSS) algorithm. Through threshold signature schemes, key fragment management is securely handled, ensuring the confidentiality and integrity of data throughout its lifecycle.

By establishing a secure and transparent storage resolution mechanism, Endless builds a trusted data governance framework, providing developers and users

with verifiable data processing workflows. This storage solution facilitates the development of decentralized applications with privacy protection at their core, creating a complete data sovereignty, encrypted storage, and regulatory compliance cycle. Leveraging zero-knowledge proofs and state-of-the-art end-to-end encryption, the Endless ecosystem seeks to attract data-sensitive industries such as healthcare and fintech, collectively fostering a compliant data circulation landscape.

3.1.14 Ensuring User Privacy and Security through Zero-Knowledge Proofs and Cryptographic Technologies

Endless employs multiple key technologies in security and privacy protection to ensure the confidentiality, integrity, and controllability of user data:

- **Dynamic End-to-End Encryption (E2EE)**: During data transmission, end-to-end encryption (E2EE) ensures that only the sender and recipient can decrypt the information. Regardless of how many intermediary nodes the data passes through, external attackers or malicious entities cannot access its contents. This not only strengthens data privacy protection but also ensures message integrity throughout transmission. Building on this foundation, Endless introduces a "session dynamic key exchange" mechanism, where a unique encryption key is generated for each session. Even if the same user rejoins a group or initiates an identical transaction, the encryption key remains different. This significantly enhances encryption security, effectively preventing replay attacks and key leakage risks.

- **Data Isolation and Access Control**: Endless implements strict data isolation strategies to ensure that data from different users remains completely segregated. Additionally, with a fine-grained access control mechanism, the

system ensures that only authorized users can access specific data, further enhancing data security.

- **Zero-Knowledge Proof-Based Privacy Protection and Identity Authentication**: Zero-Knowledge Proofs (ZKP) enable users to prove their identity or verify certain attributes without revealing any private information. This technology is widely applicable in identity verification, confidential transactions, and decentralized finance (DeFi), ensuring data security while maintaining user privacy.

- **Secure Storage via Distributed Key Management and Redundant Encryption**: Endless employs distributed key management and redundant encryption techniques to enhance storage security. Specifically, the system utilizes Shamir' s Secret Sharing (SSS) algorithm to split encryption keys into multiple fragments, which are then stored across different nodes. Only when a sufficient number of nodes collaborate can the key be reconstructed, ensuring that even if some nodes fail or come under attack, data remains securely recoverable.

With a transparent and robust security architecture, Endless not only strengthens user trust but also enhances the overall ecosystem's reliability. As demand for privacy protection continues to grow, Endless' strong security framework will become a vital component of its market competitiveness. This trust mechanism will not only attract more users but also encourage deeper engagement from developers, further accelerating the ecosystem' s expansion.

3.1.15 Modular Components and Cross-Platform Compatibility for Lower Development Barriers

Endless provides a comprehensive modular Web3 component library that supports a wide range of core application scenarios, significantly enhancing development efficiency and flexibility. Currently, the supported components span blockchain network modules, DeFi modules, social application modules, gaming modules, NFT modules, and decentralized identity (DID) components. In total, Endless supports over 100 Web3 components, including smart contracts, public chains, WebRTC, zero-knowledge (ZK) authentication, wallets, payments, identity authentication, NFT trading and management, on-chain red envelopes, operational tools, on-chain data analytics, DID components, AI components, multilingual support, browser integration, game development, application locks, and automated burn mechanisms.

Web3 Component Platform

Endless has built a Web3 component platform, enabling developers to flexibly select and integrate various components based on specific needs. This platform allows third-party developers to deploy custom components to the component marketplace, making them available for other developers while earning revenue and incentives. The modular design significantly enhances application scalability and maintainability, allowing developers to efficiently manage and deploy various functional modules through the component center, ensuring competitiveness in a rapidly evolving technology landscape.

For example, when building a DeFi application, developers can readily utilize smart contract and payment components to quickly establish liquidity protocols while employing on-chain data analysis tools to monitor application performance

in real-time. This flexibility not only lowers development barriers but also accelerates product iteration cycles.

Cross-Platform Compatibility

In addition to providing diverse Web3 components, Endless offers multilingual SDKs to assist Web2 and Web3 developers, supporting multiple programming languages, including JavaScript, Python, and Rust. This approach addresses the challenge of poor compatibility and the high learning curve associated with Web3 development. Traditional Web3 development often requires developers to learn new programming languages (such as Solidity) and understand the intricacies of smart contracts, which poses a significant challenge for those accustomed to Web2 technology stacks. By offering familiar tools and language support, Endless helps developers seamlessly bridge the gap between Web2 and Web3, accelerating the widespread adoption of Web3 technologies across various industries.

3.1.16 Distributed Computing for Enhanced Platform Scalability

Endless employs globally leading distributed routing node technology to achieve highly scalable system expansion and load balancing, ensuring outstanding performance and stability across global operations. Distributed computing nodes provide computational and data processing services, enabling the platform to maintain high efficiency even under high concurrency conditions. The distributed computing architecture offers significant advantages in data processing and performance, effectively mitigating bottlenecks inherent in centralized systems while improving overall system fault tolerance and availability.

Endless integrates a relay network as a core infrastructure component, combining global routing optimization, hardware acceleration, and Content Delivery Network (CDN) acceleration technologies to build a highly efficient, low-latency distributed network system. This system features several key attributes:

- **Intelligent Routing Optimization**: Dynamically selects the optimal nodes to minimize data transmission latency and enhance overall communication efficiency.
- **Hardware Acceleration**: Optimizes underlying hardware computational resources to improve processing performance in distributed computing environments.
- **CDN Acceleration**: Leverages a global CDN network for low-latency content distribution, ensuring a consistent and efficient access experience for users worldwide.

With its distributed computing architecture and optimized relay network, Endless ensures high-performance processing capabilities even under large-scale access, high computational demands, and global scenarios, providing a stable and efficient infrastructure for Web3 applications.

3.1.17 Cross-Chain Compatibility for Multi-Chain Ecosystem Development

Endless is actively developing and integrating cross-chain bridge tools to facilitate the secure transfer of multi-chain assets and seamless data synchronization, ensuring both the security and reliability of cross-chain interactions. This mechanism aims to establish seamless interoperability between Endless and ma-

jor blockchain networks, allowing cross-chain assets to circulate and be utilized safely and efficiently.

Simultaneously, Endless actively participates in and promotes the establishment of cross-chain interoperability standards to enhance the compatibility of Endless with other blockchain networks and foster multi-chain ecosystem collaboration. Endless has already completed cross-chain integration with Ethereum, enabling ETH asset transfers and smart contract interactions, with further expansion plans to include Polygon, Binance Smart Chain (BSC), and other major blockchain networks.

By integrating distributed computing with cross-chain technology, Endless addresses the limitations of single-chain compatibility and scalability:

- **Distributed Computing Network**: Provides extensive computational resources and data processing services through globally distributed computing nodes to support large-scale decentralized applications.
- **Cross-Chain Interoperability**: Enables asset flow and data exchange across multiple blockchain environments through cross-chain bridge tools, eliminating communication barriers between different chains.

With its robust computational capacity and cross-chain compatibility, Endless aspires to be a key infrastructure provider in the multi-chain ecosystem, driving the global adoption and expansion of decentralized technologies.

3.1.18 Modular Components and Cross-Platform Compatibility for Lower Development Barriers

Endless provides a comprehensive modular Web3 component library that supports a wide range of core application scenarios, significantly enhancing development efficiency and flexibility. Currently, the supported components span

blockchain network modules, DeFi modules, social application modules, gaming modules, NFT modules, and decentralized identity (DID) components. In total, Endless supports over 100 Web3 components, including smart contracts, public chains, WebRTC, zero-knowledge (ZK) authentication, wallets, payments, identity authentication, NFT trading and management, on-chain red envelopes, operational tools, on-chain data analytics, DID components, AI components, multilingual support, browser integration, game development, application locks, and automated burn mechanisms.

3.1.19 AI and Blockchain Integration Architecture

As generative AI and autonomous decision-making AI increasingly become integral to internet infrastructure, the deep integration of Web3 and AI is ushering in a new paradigm for blockchain technology. The alignment of their core values —such as openness, transparency, and data sovereignty—lays the philosophical and technical groundwork for the next generation of intelligent decentralized applications. Endless, as the first blockchain developer platform designed for AI empowerment, leverages its dedicated blockchain infrastructure to provide comprehensive AI computation support, data integration mechanisms, and advanced smart contract environments. These capabilities enable developers to efficiently build Crypto-AI applications, fostering a deeper synergy between AI and Web3 while reshaping the interaction model between Crypto and AI.

AI Interoperability and Toolchain Support

AI Agents, intelligent entities capable of perceiving, making decisions, and executing actions, are becoming a key application form for AI deployment. For instance, Gartner predicts that by 2028, 15% of daily work-related decisions will be handled by AI agents. As an essential operating environment for AI agents,

Web3 requires AI to have on-chain data access capabilities and the ability to efficiently interact with decentralized applications (DApps). Endless enhances AI interoperability through the following mechanisms:

- **Integration of Mainstream AI Models**: Provides pre-packaged SDKs for large AI models, supporting ChatGPT, Stable Diffusion, and compatibility with AI agent frameworks such as Eliza and Swarms, enabling seamless AI agent deployment within DApps.
- **Provision of Atomic AI Computing Capabilities**: Supports multilanguage translation, natural language processing, image recognition, and other AI functionalities while enabling smart contracts with AI decision-making capabilities, allowing them to autonomously execute on-chain transactions, data analysis, and asset management.
- **Optimized AI and Web3 Interaction**: Implements standardized protocols that allow AI to access on-chain identity, wallets, and transaction data, improving data utilization efficiency for AI agents in the Web3 ecosystem.

Additionally, Endless has collaborated with the University of Surrey' s AI research team in the UK to promote efficient AI computation within blockchain environments.

AI-Friendly Infrastructure

Deploying AI on blockchain requires a high-performance, low-cost computational environment. Endless enhances its infrastructure in the following ways:

- **High Scalability**: Supports high-throughput, low-latency transactions with an average confirmation time of 0.5 seconds and tens of thousands

of transactions per second (TPS), enabling AI agents to execute tasks in real time.

- **AI-Optimized Smart Contracts**: Implements the Move programming language to enhance resource management and security mechanisms, improving AI smart contract execution efficiency while reducing vulnerability risks.

Developer Ecosystem and Cross-Chain Support

To lower the entry barrier for AI developers into the Web3 ecosystem, Endless offers:

- **Multi-Language SDKs**: Supports Python, JavaScript, and other programming languages to reduce the cost of integrating smart contracts.
- **Cross-Chain Bridging Capabilities**: Enables cross-chain asset transfers and data synchronization, enhancing AI agent interoperability across multiple blockchain environments.
- **Ecosystem Support and Incentives**: Hosts AI Agent Hackathons and provides specialized funding to attract AI projects to develop and deploy on the Endless platform.

AI Agentic Super Intelligent System

With support from the Endless ecosystem, the future of Web3 will enable the development of an AI Agentic Super Intelligent System. This system is characterized by:

- **Autonomous Decision-Making by AI Agents**: AI agents perform intelligent analysis based on on-chain data, enabling autonomous collabo-

ration, such as executing transactions, generating NFTs, and optimizing smart contracts.

- **Decentralized AI Economic System**: Through tokenomics, the Web3 ecosystem can provide AI agents with decentralized identity authentication, incentive mechanisms, and rights attribution, ensuring the sustainable operation of AI in crypto environments.
- **Interoperability of Cross-Chain AI Applications**: Endless provides standardized APIs, allowing AI agents to interact seamlessly across different blockchain networks, fostering a broader Web3-AI integration.

This visionary innovation will drive the adoption of AI in Web3, making blockchain technology more intelligent and providing foundational support for next-generation intelligent financial systems, digital art markets, and automated governance structures.

As the convergence of AI and Web3 deepens, providing an efficient, intelligent, and compatible development environment for Crypto-AI has become a critical industry demand. As a foundational platform for AI and Web3 convergence, Endless accelerates the deployment of Crypto-AI applications by offering an AI-friendly smart contract environment, high-performance computing architecture, and comprehensive developer tools while facilitating the widespread adoption of AI agents on the blockchain.

3.1.20 Secure Transaction Fee Deduction Mechanism

Endless provides a secure and reliable transaction fee deduction mechanism to ensure accurate and transparent fee calculations during transaction execution. By employing simulated transaction calculations and on-chain confirmation security mechanisms, the system guarantees that the actual fees charged align

precisely with the initially projected costs, thereby preventing common Web3 issues such as ”fee discrepancies” and unintended fund losses. This approach not only enhances the security of financial transactions but also optimizes the overall user experience, allowing various applications to complete transactions quickly, securely, and efficiently.

Through this secure fee deduction mechanism, Endless reinforces transaction execution reliability in the Web3 ecosystem, further facilitating the adoption and growth of decentralized applications.

3.2 Core Value Propositions

Endless was founded with the fundamental goal of leveraging technological innovation to empower users with greater autonomy, ensuring data privacy and security, and fostering a decentralized co-creation ecosystem. This enables users to create and receive the value they rightfully deserve in the digital world. Endless strives to shift Web3 from its current financial focus toward a utility-driven paradigm, realizing the promises of decentralized technology in user empowerment and value co-creation. The core value propositions of Endless are encapsulated as follows:

1 Security and Privacy as the Foundation

In the Web3 industry, security and privacy form the essential foundation. Traditional internet infrastructure heavily relies on centralized servers and data storage, making user privacy vulnerable to threats and leading to frequent data misuse. Privacy protection extends beyond mere data encryption; it is also critical in fostering user trust when engaging in digital ecosystems. In the Web3 world, users are no longer required to depend on centralized third parties to

manage their identities or data; instead, decentralized identity authentication mechanisms and smart contracts ensure that user data is accessible only with explicit authorization.

Endless guarantees a high level of security and privacy protection through its advanced data security architecture. This not only attracts security-conscious users and strengthens project credibility but also fosters deeper trust with potential partners and investors.

Endless' data security and privacy protection framework is built on the following key technologies: dynamic end-to-end encryption, data isolation and access control, zero-knowledge proofs, and secured distributed key management with redundant encryption.

2 Developer and Project-Centric Modular Design

As a decentralized technology development platform, Endless introduces an innovative distributed cloud component protocol, redefining how developers build applications through modular architecture. The Endless distributed cloud component protocol offers an open component marketplace and a rich collection of essential modules, enabling developers to seamlessly assemble and deploy Web3 applications without requiring in-depth expertise in blockchain technology. This significantly lowers technical barriers, facilitating a smooth transition for Web2 developers into the Web3 space.

3 Low-Barrier User Experience Design

To optimize user experience, Endless introduces a Gas Sponsorship Mechanism, allowing developers or project owners to cover gas fees incurred by users during blockchain transactions. With this mechanism, users can interact with decentralized applications (DApps) without incurring any transaction costs, mak-

ing Web3 applications more accessible, especially to new users unfamiliar with blockchain mechanics.

This approach not only reduces economic barriers to adoption but also serves as a valuable tool for developers to increase DApp engagement and user retention. By implementing this model, Web3 technology adoption is significantly accelerated, making Endless a catalyst for mainstream adoption and technological proliferation.

4 AI Integration to Enhance Ecosystem Innovation and User Experience

Endless is deeply integrating artificial intelligence (AI) capabilities with its decentralized platform, harnessing AI to accelerate Web3 adoption and value creation. By incorporating AI-powered models, Endless enhances Web3 applications across multiple domains, including smart contract automation, intelligent data analytics, automated processing, personalized recommendations, AI-powered customer service, and dynamic risk management.

This integration of AI into the Endless ecosystem significantly enhances user experience and engagement. Developers can streamline application development with AI-driven automation, while users benefit from personalized, highly efficient services. Additionally, AI-powered recommendations and automated processing features further increase user-centric customization and retention.

Alongside AI integration, Endless employs decentralized storage solutions to safeguard user data privacy and security, ensuring both tailored and secure AI-driven services.

5 Achieving True Economic Value Through Co-Creation

The co-creation economy ensures that every user is rewarded based on their contributions within the ecosystem. Beyond technical innovations, Endless is committed to fostering a truly decentralized co-creation economy. In the Endless ecosystem, users can directly benefit from the ecosystem' s growth through active participation and contributions, rather than relying on centralized platforms for value distribution.

Through smart contracts, creator economy mechanisms, and decentralized governance, Endless guarantees that users who generate content, offer services, or engage in community governance receive equitable rewards. This model not only incentivizes participation but also fosters a more diverse, secure, and user-driven ecosystem. Endless empowers users to break free from the control of traditional centralized platforms, granting them true ownership and ensuring transparent, fair mechanisms for value distribution.

4 Business Model and Market Positioning

4.1 Target Audience

The target users of Endless include Web2 developers, Web3 developers, project teams, and general users. Addressing the diverse needs and challenges of different user groups, Endless provides comprehensive solutions aimed at promoting the adoption and application of Web3 technology.

Below is a detailed analysis of each target group along with the corresponding application scenarios:

1 Web2 Developers

Web3 development involves complex technologies such as smart contracts, decentralized storage, and consensus mechanisms. For developers accustomed to the Web2 technology stack, transitioning to Web3 presents a steep learning curve. Web2 developers typically work with traditional programming languages and frameworks such as JavaScript, Python, and Java. To transition to Web3, they need to master new development languages such as Solidity, Rust, and Move, as well as blockchain technology. This transition not only requires learning an entirely new development paradigm but also demands an in-depth understanding

of how decentralized systems operate.

To address the challenges faced by Web2 developers, Endless offers a series of pre-built modules and multi-language SDKs, enabling developers to build DApps using familiar programming languages such as JavaScript and Python. These modular components cover core functionalities such as payments, identity authentication, and data storage, allowing developers to focus on business logic without delving deeply into the underlying technical implementations. Additionally, Endless provides comprehensive documentation, tutorials, and community support to help developers quickly grasp key Web3 development concepts and tools. This not only lowers the learning barrier but also fosters a collaborative ecosystem where developers can share knowledge and insights.

2 Web3 Developers

Web3 developers require a high-performance blockchain platform to support the development of complex DApps, particularly those handling high-concurrency user transactions. The efficiency and stability of the system are essential for ensuring a seamless user experience. Furthermore, Web3 developers aim to create innovative functionalities and applications that cater to evolving market demands and user expectations.

For Web3 developers, Endless delivers powerful computing and data processing capabilities to ensure exceptional DApp performance even under high workloads. Its architectural design supports horizontal scalability, allowing for seamless growth in user base and business expansion. Additionally, Endless provides smart contract automation tools and AI-powered analytics, enabling developers to incorporate intelligent elements into contract design and execution. This enhances development efficiency and optimizes the overall intelligence of applications. Using the Endless platform, Web3 developers can build high-frequency

trading applications or leverage AI functionalities to automate and refine smart contract execution.

3 Project Teams

In a highly competitive market environment, increasing user engagement and activity is a key priority for project teams. The ability to attract and retain users effectively is directly linked to the long-term success of a project. Additionally, project teams require efficient tools for managing communities and token economies to ensure sustained community engagement and token market stability.

For project teams, Endless provides an infrastructure that supports multi-currency payments and smart contract security, enhancing transaction convenience and security. Through the platform' s token management tools, project teams can effortlessly manage token issuance, distribution, and governance, ensuring a healthy token economy. Additionally, Endless offers a range of private domain operation tools, including precision marketing, airdrop campaigns, and social platform integrations, helping project teams rapidly scale their community presence. These tools not only boost user interaction frequency but also enhance user engagement and loyalty.

4 General Users

Web2 users prioritize data privacy, while Web3 users place greater emphasis on decentralization and transparency. General users expect blockchain applications to provide a user experience comparable to Web2 applications while benefiting from the privacy protection inherent in decentralization. Additionally, users seek to avoid complex operations and high usage costs, aiming for a seamless and intuitive experience akin to traditional internet applications.

To cater to general users, Endless supports developers at both the protocol and component levels in optimizing user interfaces and enabling a seamless transition from Web2 to Web3. This ensures that users can enjoy the convenience and smooth experience of traditional applications. Furthermore, Endless integrates decentralized storage and zero-knowledge proof technologies to safeguard user data privacy and security.

4.2 Business Model

As a blockchain-based ecosystem protocol, Endless has a diversified revenue stream. Below are the monetization models of Endless within the Web3 Genesis Cloud ecosystem:

1 Component Marketplace

The Endless Component Marketplace is a decentralized trading platform for components, where developers can publish and sell self-developed components. Users can browse, purchase, and integrate these components into their applications through the Endless platform. All transactions are executed automatically via smart contracts to ensure transparency and security. Endless charges a fixed percentage as a transaction fee for each sale. This fee model not only incentivizes developers to continuously innovate and release high-quality components but also provides a stable revenue stream for the platform.

By offering ready-made and easily integratable components, Endless significantly reduces developers' time to market. These components cover a wide range of functionalities, from user authentication to payment processing, enabling developers to focus on business logic without having to build complex underlying infrastructures. Additionally, Endless continuously expands its component li-

brary and offers developer support and marketing promotion services to attract more developers into its ecosystem. This strategy not only enhances the platform' s market appeal but also strengthens its competitive edge in the Web3 industry.

2 SDK and API Services

Endless offers multi-language SDKs compatible with existing technology stacks, along with comprehensive documentation, tutorials, and technical support to help developers quickly master Web3 development. This lowers the entry barriers for Web2 developers, allowing them to smoothly transition into the Web3 development environment.

The Endless SDK and API follow a pay-per-call billing model, flexible to accommodate the needs of different developers, with fees calculated based on actual usage. Additionally, for enterprise customers requiring long-term and stable services, Endless provides a subscription-based model, enabling users to pay a fixed monthly or annual fee for unlimited or high-quota API access.

3 Cloud Server and Storage Fees

Endless offers flexible cloud service packages, allowing developers to choose different storage and bandwidth plans according to the scale and needs of their projects. Its pay-as-you-go model ensures that developers only pay for the resources they actually use, reducing operational costs. Furthermore, leveraging a distributed storage architecture and optimized network acceleration mechanisms, Endless enhances DApp access speed and stability, ensuring a smooth user experience. By providing efficient and secure storage and data transmission services, Endless not only generates a stable revenue stream but also reinforces its market competitiveness.

4 Node Staking

Endless token holders can stake their tokens to validator nodes to earn network staking rewards. Additionally, as a validator node operator, Endless accepts delegated staking from project teams or individual users and generates revenue through management fees or staking interest. The entire staking process is automated via smart contracts to ensure transparency and security. This mechanism not only creates revenue for the platform but also strengthens the security and stability of the network.

5 On-Chain Transaction Fees

All on-chain transactions within the Endless ecosystem, including component transactions and DApp operations, require Endless tokens for gas fees. A portion of the collected gas fees will be used for token burning to maintain the economic equilibrium, while the remainder will be allocated to validator nodes and the ecosystem fund to support the sustainable development of the Endless ecosystem.

6 DApp and Mini-Program Distribution

Endless provides a globalized application distribution platform, enabling developers to publish and promote their DApps and mini-programs. The platform is equipped with analytics tools and user feedback systems to help developers optimize their products and enhance user satisfaction. Endless monetizes this service by charging application promotion fees or sharing revenue with developers. This model not only generates economic benefits for the platform but also provides developers with additional exposure and marketing channels. Additionally, Endless regularly hosts developer conferences and application competitions to foster technological innovation and ecosystem collaboration, promoting long-

term growth.

7 Web3 Gaming and NFT Marketplace

Endless builds a vibrant gaming and NFT marketplace to encourage long-term user engagement and increase platform retention. The platform supports user-generated content (UGC), allowing users to create and trade gaming assets or NFT artworks, thus enhancing interaction and fostering a sense of community. Moreover, Endless provides comprehensive tools and resources to empower developers for innovation in Web3 gaming and NFTs. The platform continuously expands its market influence by collaborating with well-known IPs and hosting creative competitions.

In the Web3 gaming sector, Endless generates revenue through in-game economic activities such as virtual item sales and in-game advertisements. In the NFT marketplace, Endless earns revenue by charging a fixed percentage as a transaction fee for NFT sales. Users need to pay transaction fees when conducting NFT trades on the platform. Additionally, Endless offers NFT minting and display services, further diversifying its revenue streams.

8 Endless Token Value

The value of the Endless token is a crucial component of the Endless business ecosystem. For more details, please refer to section "5.2 Endless Economic Model."

4.3 Market Positioning and Competitive Analysis

1 Market Positioning

Endless is an innovative distributed cloud intelligent component protocol dedicated to bridging Web2 and Web3. It not only enables traditional Web2 developers to migrate to Web3 with low costs and high efficiency but also provides abundant on-chain and off-chain resources for the expansion of the Web3 ecosystem. This allows Endless to meet the growing demand for large-scale, high-concurrency, and privacy-enhanced decentralized applications.

One of the core competitive advantages of Endless lies in its modular component marketplace. This marketplace allows developers to seamlessly integrate functionalities in the form of plugins, making application development more flexible and efficient. The modular design enables developers to quickly introduce new features based on specific requirements without building from scratch, significantly reducing time-to-market and development costs.

Additionally, Endless seamlessly integrates blockchain technology with advanced AI capabilities, providing powerful AI computing resources for decentralized applications and users. It plays a crucial role in creator economies, security, privacy protection, payments, and social interactions. Through its native stablecoin, Endless facilitates seamless interoperability between ecosystem applications, underlying protocols, and applications within the ecosystem, as well as between traditional commerce and the Web3 economic system. Furthermore, by fostering deep collaborations with Web2 industries, Endless drives the growth of super applications in areas such as privacy-based social networking, the creator economy, and cross-border e-commerce. Additionally, the platform explores innovations in

specialized Web3 sectors such as AI and finance, working alongside industry partners to co-create a cross-sector decentralized ecosystem that delivers user value through technological and ecosystem synergy.

2 Resource Advantages

Endless will collaborate with the world's three major cloud computing giants —AWS (Amazon Web Services), Alibaba Cloud, and Tencent Cloud—to establish a globally distributed Web3 social network node infrastructure. This collaboration ensures high efficiency, stability, and scalability in network communications. These infrastructure resources not only support the core protocol operations of Endless but can also be shared with other ecosystem applications, enhancing the platform's overall operational capabilities.

3 Competitive Analysis

- **Comparison with Cosmos**
  - **Advantages**: Cosmos excels in blockchain interoperability. Its Tendermint consensus algorithm and IBC (Inter-Blockchain Communication) protocol enable efficient and secure multi-chain interactions, facilitating seamless data and asset transfers between different blockchains.
  - **Limitations**: Despite its advantages in cross-chain interoperability, Cosmos offers relatively limited ecosystem support for component marketplaces and privacy protection. The scarcity of available components makes it harder for developers to access a diverse range of modular tools. Additionally, Cosmos has relatively basic privacy protection technology, which may not fully meet the needs of applications with high data security requirements.

- **Endless' Differentiated Advantage**: Endless provides a more comprehensive decentralized storage solution and has built a robust modular component marketplace. By adopting more advanced privacy protection technologies and a well-developed component ecosystem, Endless offers developers greater flexibility and security. This differentiation makes Endless particularly attractive to developers and user communities that prioritize privacy and versatility.

- **Comparison with ICP (Internet Computer Protocol)**
  - **Advantages**: ICP has significant competitiveness in modular smart contracts and decentralized computing. Its innovative on-chain computing model enables developers to create complex decentralized applications while offering high scalability in computational performance.
  - **Limitations**: However, ICP has certain limitations in cross-chain compatibility, making it challenging to achieve efficient interoperability with other blockchains. Additionally, its high technical barrier may lead to a suboptimal user experience, limiting widespread adoption among non-technical users.
  - **Endless' Differentiated Competitiveness**: Unlike ICP, which focuses on decentralized computing, Endless prioritizes providing an easy-to-use unified development framework that lowers the entry barrier for developers. By supporting multiple technological standards and introducing Gas fee delegation mechanisms, Endless enables developers to build and deploy Web3 applications with greater ease. Furthermore, Endless' broad compatibility grants it enhanced flexibility, allowing it to thrive in multi-chain ecosystems, whereas ICP mainly focuses on developing its own decentralized network.

5 Endless Token Economic System

5.1 Token Design and Distribution Mechanism

The native blockchain token of the Endless Web3 Genesis Cloud (EDS) serves as the fundamental economic unit of the network, fulfilling multiple core functions, including transaction fee payments, governance participation, and staking rewards. A well-structured token issuance and inflation mechanism, incentive staking, governance framework, and transaction fee allocation are designed to ensure the long-term stability of the network, encourage positive engagement from ecosystem participants, and drive the sustainable growth of the ecosystem.

5.1.1 Token Initial Supply and Distribution

Initial Total Supply: 10 billion EDS.

Token Allocation Ratio:

- **Ecosystem and Community** (32.10%): Used to incentivize community participation, reward developers, promote ecosystem growth, and support network staking and governance incentives.
- **Foundation** (20.00%): Allocated for ecosystem development support, long-term reserves, project operations, and emergency response to ensure the sustainable growth of the system.

- **Early Supporters** (11.46%): Rewarding the substantive contributions of early supporters of the project.
- **Team** (20.00%): Rewarding core team members to ensure their long-term commitment and continuous technological innovation.
- **Market Partners** (8.64%): Dedicated to market expansion, strategic collaborations, and incentives for ecosystem partners.
- **Public Sale** (3.00%): Used for initial fundraising and token liquidity provisioning.
- **Venture Capital and Strategic Partners** (2.20%): Allocated for strategic resource integration and liquidity enhancement.
- **Genesis Node Staking** (2.60%): Used for staking by genesis nodes to maintain network operations.

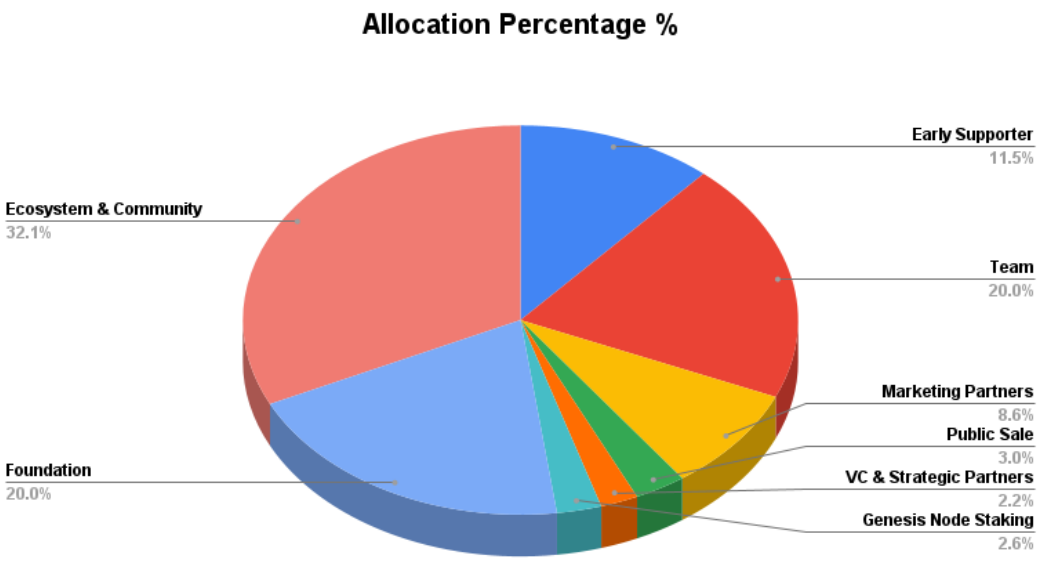

Figure 5.1: Token Allocation Ratios

5.1.2 Inflation Mechanism and Stability

Endless adopts an inflationary economic model to support network growth. Newly issued inflationary tokens are primarily allocated to network rewards, the ecosystem fund, and governance budgets. The inflation rate will be dynamically adjusted based on economic models and the overall development of the ecosystem. The specific mechanisms are as follows:

- **Initial Inflation Rate**: Set at 8%.
- **Annual Reduction Mechanism**: The inflation rate decreases by 15% per year until it stabilizes at a minimum rate of 1.5%. This ensures long-term reward incentives for the network while avoiding excessive inflation that could destabilize the ecosystem.

- **Inflation Rate Cap**: The maximum inflation rate is capped at 8% to prevent excessive dilution of token value.
- **Governance-Adjustable Inflation**: Token holders can participate in annual governance voting to fine-tune the inflation rate within a limited range of ±1% to adapt to ecosystem development needs.

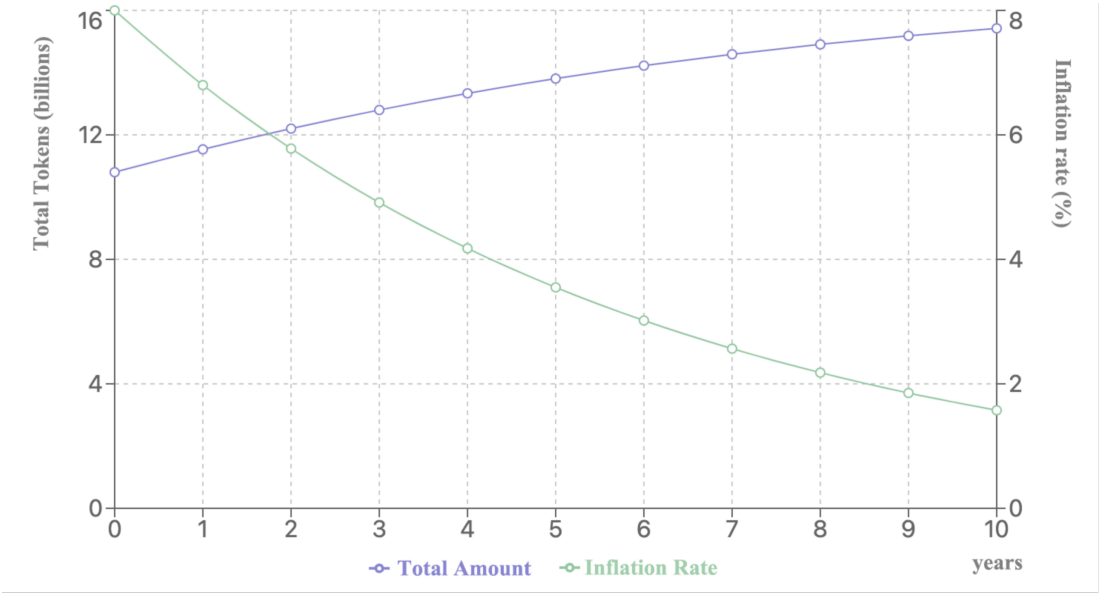

Figure 5.2: Token Supply and Inflation Rate Over Time

To mitigate the potential negative impact of inflation on token value, Endless will implement both a **Gas Fee Burning Mechanism** and **Periodic Buyback and Burn** strategies. These measures ensure the stability of the economic system under varying market conditions.

Distribution of Inflationary Tokens:

- **Staking Rewards** (60%): Used to incentivize validator nodes and token stakers, ensuring the security and stability of the network.

- **Ecosystem Development Fund** (30%): Allocated to foster ecosystem growth, attract developers, and encourage community members to actively contribute to the enhancement and optimization of the ecosystem.
- **Relay Network Incentives** (10%): Provided to support relay node operations, promoting efficient network communication and data transmission.

5.2 Endless Ecosystem Economic Model

5.2.1 Overview of EDS Token Utility

Within the Endless ecosystem, the native public blockchain token EDS has a wide range of applications across multiple dimensions, including but not limited to:

- **Transaction Fee Payments**: Used for paying Gas fees and on-chain transaction fees.
- **Network Staking and Incentives**: Holders can participate in network validation through EDS staking and receive staking rewards.
- **Underlying Native Asset Functions**:
  - Used as collateral for decentralized lending;
  - Supports AMM (Automated Market Maker) liquidity mining;
  - Functions as a medium for cross-chain asset transfers, enabling interoperability between different blockchains;
  - Used as collateral for issuing synthetic assets, such as minting stablecoins.

- **Ecosystem Growth Incentives**:
  - **Developer Incentives**: Includes protocol development subsidies, bug bounty programs, and innovation application incubation funds;
  - **Project Support**: Provides early-stage project funding, market promotion subsidies, and technical support rewards;
  - **User Incentives**: Used for early user airdrops, event rewards, and community contribution appreciation.
- **Ecosystem Service Payments**: Used to pay for various services, including component purchases, decentralized storage, AI services, etc.
- **Governance Participation**: EDS holders can participate in ecosystem governance by staking tokens. Through a voting mechanism, they can decide on technical, economic, and ecosystem-related proposals, such as network upgrades and inflation rate adjustments.

5.2.2 Transaction Fees

Transaction fees are a crucial component of the Endless economic system, designed to:

- **Prevent Network Abuse**: Implement a reasonable fee mechanism to prevent excessive resource consumption;
- **Optimize Resource Allocation**: Facilitate transaction prioritization and improve blockchain space utilization efficiency;
- **Provide Rewards for Stakers and Validators**: Ensure the economic sustainability of network operations.

The transaction fees in the Endless network consist of **Base Fees** and **Dynamic Fees**:

- **Base Fees**: All on-chain transactions require a base fee, calculated based on transaction data size, ensuring that each transaction covers at least the minimum network resource consumption costs. This includes:
  - **Computation Fees**: Covers computational resource costs;
  - **Storage Fees**: Covers long-term storage costs of transaction data.
- **Dynamic Fees**: The gas price in the Endless blockchain is subject to a dynamic adjustment mechanism that fluctuates based on network supply and demand. Validator nodes prioritize transactions with higher gas prices, and users can opt to pay a higher gas fee to increase transaction execution priority and accelerate processing times.

Transaction Fee Allocation Mechanism:

- A portion of transaction fees is allocated to validator nodes as incentives for processing transactions and maintaining network operations;
- Another portion of EDS tokens is burned through a token-burning mechanism to reduce market supply and optimize the economic balance.

The specific allocation and burning ratios for transaction fees will be dynamically adjusted based on network conditions and governance voting, with adjustments implemented through on-chain smart contract parameters to ensure optimal network efficiency.

5.2.3 Endless Ecosystem Economic Model

The major roles within the Endless ecosystem and their token economic flows are illustrated below:

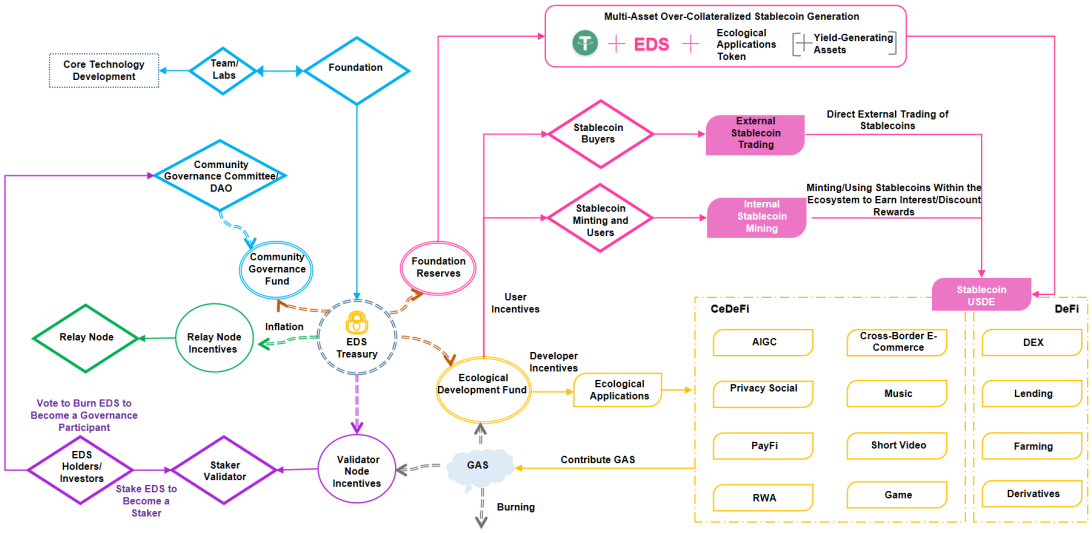

Figure 5.3: Endless Ecosystem Economic Model

Foundation: Responsible for managing EDS token treasury, with foundation management members consisting of the Endless Team and Endless Labs.

- The **Endless Team** focuses on the development of Endless' core technologies;
- **Endless Labs**: Focuses on innovations in cryptography and cross-chain technology research.

Treasury: The treasury employs a hybrid fund management approach that combines pre-set allocation ratios with dynamic adjustments. It establishes strategic reserves, a community governance fund, an ecosystem development fund, and a validator node incentive pool. Additionally, inflationary EDS tokens will be allocated to a dedicated relay node incentive system to ensure flexible resource allocation and long-term economic sustainability.

Treasury assets are categorized as follows:

- **Foundation Reserves**:

  - Reserve assets consist of EDS issued by Endless, NUSD, and USDT raised through funding;
  - Maintains and manages the collateral assets of NUSD to ensure 100% over-collateralization of the stablecoin. Initially accepted collateral assets include USDT, EDS, and tokens from ecosystem applications, with future expansion to include more yield-bearing assets as collateral.

- **Ecosystem Development Fund**:
  - Promotes the development of ecosystem applications and stablecoin adoption;
  - A portion of the gas fees generated by ecosystem applications will be burned, while another portion will be returned to the ecosystem fund, and part will be used to incentivize staking nodes.

- **Community Governance Fund**: Allocated as governance rewards for community governance participants.

- **Validator Node Incentives**: Rewards for validator nodes and token stakers to enhance network security.

- **Relay Node Incentives**: Encourages relay node operations and services to improve ecosystem interoperability.

Community Governance Committee / DAO:

- Responsible for managing the Community Governance Fund;

- Allows token holders to participate in network governance via DAO voting, making decisions on key parameters such as network upgrades, inflation rate

adjustments, stablecoin collateral asset types, and over-collateralization ratios;

- Voting with tokens results in their burning, ensuring the fairness and long-term sustainability of the governance system.

Relay Nodes:

- Relay nodes provide data forwarding and network optimization services for the system and ecosystem applications;
- Contributors operating relay nodes receive EDS rewards.

Stakers: Earn network rewards and a share of on-chain transaction fees by staking EDS.

Validator Nodes: Operators of validator nodes receive EDS rewards as an incentive for maintaining network security and stability.

5.3 Staking and Incentives

Endless implements a well-designed staking and incentive mechanism to ensure the active participation of network participants (validators and delegators) while maintaining network security and decentralization. The following sections provide a detailed explanation of Endless' staking mechanism, reward distribution, and penalty system.

5.3.1 Staking Mechanism

Endless adopts a delegated staking mechanism, described as follows:

- **Validator Nodes**: In the Endless network, entities that hold a sufficient amount of Endless tokens and meet specific requirements can become validator nodes. Validators are responsible for processing transactions and participating in network consensus.
- **Delegated Stakers**: Endless token holders can delegate their tokens to one or more validator nodes. Delegated stakers support validator operations through staking, and the staking rewards earned by validators will be proportionally distributed to delegated stakers.

5.3.2 Staking Rewards and Penalties

Staking Rewards

Validator nodes and stakers participate in network validation by staking EDS tokens and receive corresponding rewards.

- **Reward Sources**: Staking rewards mainly come from the following three sources:

  1. Staking reward pool
  2. Newly minted tokens from Endless' inflationary issuance
  3. Distribution of transaction fees

  Rewards are automatically distributed at the end of each Epoch cycle (every two hours).

- **Reward Distribution**: Staking rewards are allocated between validator nodes and delegated stakers. Validators can set a commission rate, which is automatically deducted from staking rewards during distribution.

Penalty Mechanism

- **Early Stage**: During the early stages of the Endless network, no slashing mechanism will be applied to validator nodes. Even if a validator node underperforms, its staked tokens will not be penalized. However, the Endless network will monitor the operational status of validator nodes. Nodes that fail to meet performance standards will be temporarily disqualified from validation and lose their reward eligibility for a specified period. Once the node resumes normal operations and meets the required observation period, its validator status will be reinstated.

- **Future Plans**: In the future, Endless may introduce stricter penalty mechanisms through on-chain governance to further enhance network security and stability. Potential measures may include reducing staked tokens or decreasing staking rewards for underperforming validators.

6 Endless Ecosystem

6.1 Overview of the Endless Ecosystem

Endless Web3 Genesis Cloud is designed to facilitate the seamless migration of Web2 developers to Web3, laying the foundation for the large-scale adoption and prosperity of Web3 applications while creating value for Web3 users. To achieve this goal, Endless Web3 Genesis Cloud has built a comprehensive and user-friendly Web3 infrastructure, incorporating key innovations such as Super Stack, AI components, decentralized network services, and the Endless public blockchain.

By leveraging this efficient, composable, privacy-preserving, and easy-to-use development ecosystem, large-scale, high-concurrency Web3 super applications —such as social media, short videos, music, cross-border e-commerce, and AI or financial applications—can thrive. This vision defines the core direction of the Endless ecosystem.

Endless "Capability Triangle": Empowering Large-Scale Web3 Applications

The growth strategy of the Endless ecosystem is based on three core pillars: **developers, project teams, and users**. The goal is to create an innovative, mutually beneficial, and sustainable decentralized ecosystem. In this system,

developers, project teams, and the community reinforce each other, forming a robust "Capability Triangle":

- **Developers** receive comprehensive support and incentives to drive continuous technological innovation;
- **Project Teams** can efficiently turn their ideas into reality and access essential resources for growth;
- **The Community** injects sustained vitality and creativity into the ecosystem. Users are no longer just passive consumers as they were in the Web2 world but become **co-builders** of the ecosystem and **investors in its value**, collectively shaping a shared Web3 community.

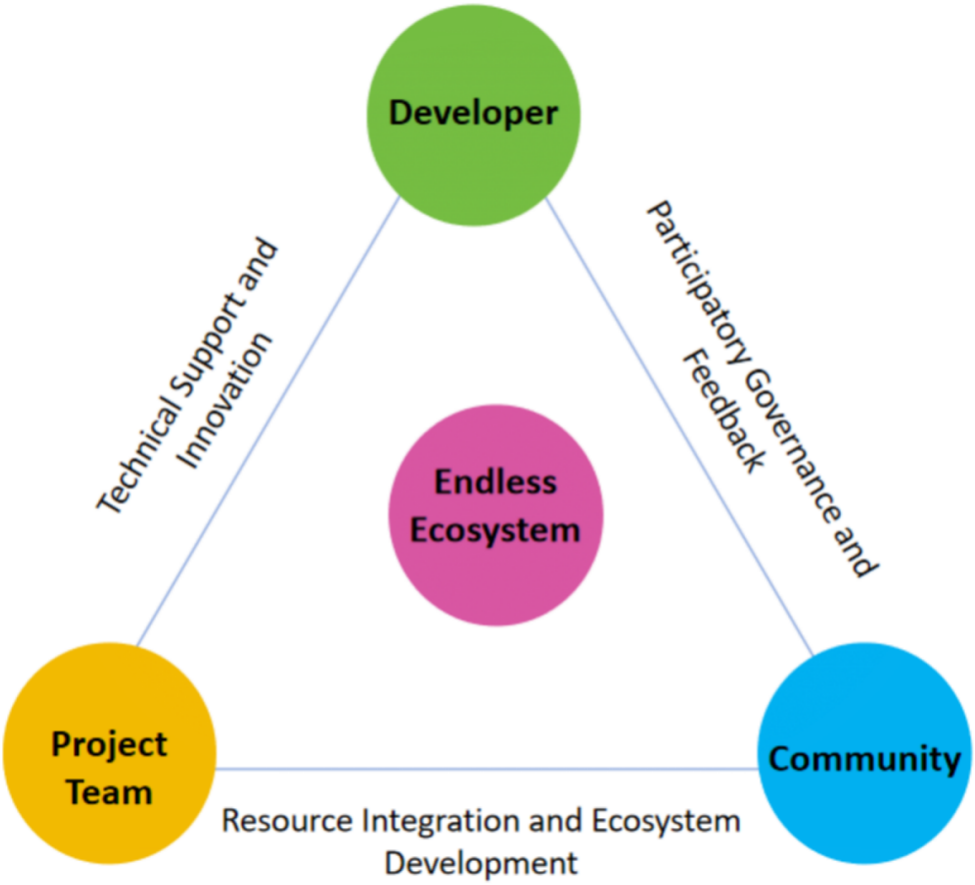

Figure 6.1: Endless Capability Triangle

The positive interactions among these three entities create a reinforcing cycle that enables the Endless ecosystem to stand out in the highly competitive blockchain space while providing comprehensive support for the large-scale deployment of Web3 applications.

Endless Web3 Genesis Cloud incentivizes ecosystem participants through its token economic system and supports the issuance of the native stablecoin NUSD to enhance liquidity and bridge business operations between Web2 and Web3. Additionally, the Endless ecosystem integrates the team's extensive experience in Web2 technologies, products, markets, and user engagement to provide full-

spectrum support for ecosystem developers. The "Capability Triangle" model further accelerates ecosystem expansion.

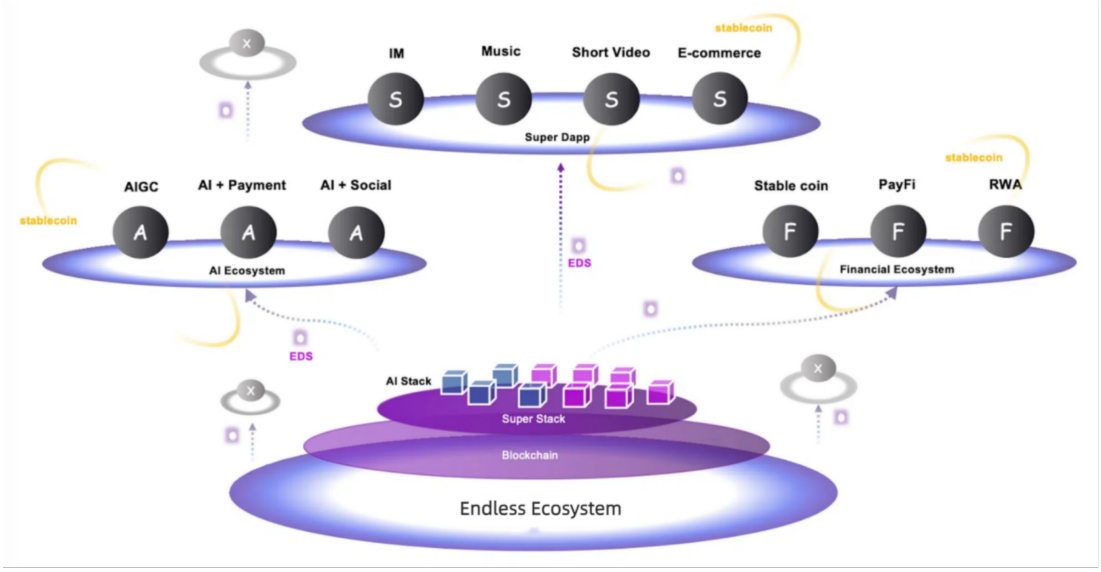

Figure 6.2: Endless Web3 Genesis Cloud Ecosystem

6.2 Ecosystem Application Scenarios

6.2.1 Luffa: Decentralized Privacy-Focused Social DApp

Luffa is the world's first free, privacy-protecting decentralized social application built on the Endless Web3 Genesis Cloud. Integrating the latest Web3 technologies, Luffa features SocialFi, multi-chain encrypted wallets, DID (Decentralized Identity) management, and community management tools. Powered by components and services from the Endless Web3 Genesis Cloud, Luffa prioritizes privacy and aims to become the world's most secure decentralized social platform. It enables users to gain true data sovereignty and achieve complete privacy protection.

Additionally, Luffa adopts a token incentive model, allowing users to not only

enjoy highly private social services but also become contributors and investors in the Luffa ecosystem. This fosters ecosystem growth and ensures shared economic benefits.

Core Value of Luffa

1. **Privacy-Preserving Application**: Luffa employs dynamic end-to-end encryption to ensure absolute privacy in chats and calls, making conversations accessible only to the intended participants. Even third parties, including the development team, cannot access user communications. Users can create and manage social accounts without providing personal information, eliminating the risk of data leaks and enabling anonymous social interactions. All messages and files are stored locally on user devices, maintaining complete control without reliance on centralized servers.

2. **Web3 SocialFi Platform**: Luffa combines social and financial features, offering cryptocurrency rewards and decentralized finance (DeFi) services. Users earn EDS, Luffa tokens, or the stablecoin NUSD based on platform activities such as daily logins, content creation, discussions, and user invitations. These ecosystem tokens can also be used to tip content creators, incentivizing high-quality content production and fostering a self-sustaining social economy.

3. **Web3 Community Management Tools**: Users can register and log in using Web2 methods while accessing on-chain functionalities. Community managers benefit from enhanced tools to build and manage their communities more effectively. Additionally, Luffa integrates digital asset trading features and NFT mechanisms, seamlessly connecting digital assets with social interactions.

4. **Support for PayFi (Stablecoin Payments) to Foster Ecosystem Commerce**: Luffa integrates social e-commerce capabilities, allowing users to purchase goods directly on the platform using the stablecoin NUSD. Compared to traditional payment methods, NUSD transactions offer greater efficiency, lower costs, and eliminate the need for high transaction fees and complex settlement processes.

5. **Secure Multi-Chain Crypto Wallet**: Luffa includes a multi-chain encrypted wallet to ensure asset security while providing seamless cross-chain transactions and asset management, enhancing user experiences across multiple blockchain environments.

6. **DID-Based Digital Identity**: In the Web3 ecosystem, data is an asset, and users require a secure and reliable identity authentication mechanism. Luffa implements decentralized identity (DID) verification technology to protect user privacy, simplify authentication processes, and enhance the security of digital identities and financial transactions.

Luffa and Its Synergy with the Endless Ecosystem

Endless provides the technical foundation for Luffa, which, in turn, leverages Endless' innovative technologies to address the privacy and security issues prevalent in traditional Web2 social applications. Luffa represents a revolutionary step toward Web3 social networking. Furthermore, Luffa's growth injects vitality into the Endless ecosystem, expanding its influence and fostering a mutually beneficial relationship within the Web3 landscape.

6.2.2 Super Apps

Super apps are large-scale, high-concurrency applications driven by data and traffic, including social media, short videos, music platforms, and cross-border e-commerce. These applications prioritize user experience and data-driven operations. However, current Web3 applications face limitations in user interaction, privacy protection, and network performance under relatively centralized infrastructures, making Web3 adoption difficult for mainstream super apps. Additionally, privacy and security are critical concerns in Web3, whereas traditional internet platforms often compromise user privacy and enable data exploitation.

To address these challenges, Endless Web3 Genesis Cloud provides an efficient and user-friendly development environment for super apps. Through the **Endless Super Stack** suite—including wallet components, zk-SNARK-based third-party login components, on-chain data tools, anonymous visualization modules, and payment modules—Web2 developers can build Web3 super applications with seamless login processes, strong privacy protection, smooth interactions, and secure trading experiences.

Leveraging decentralized architectures and technologies such as zero-knowledge proofs (ZKP), Endless ensures data security and user autonomy over personal information. Decentralized identity verification and smart contract mechanisms ensure that user data is accessed and utilized only with explicit permission. Additionally, Endless employs decentralized governance models, giving users greater control over platform regulations, enhancing trust, and sustaining long-term Web3 ecosystem adoption.

From an economic perspective, Endless incentivizes developers through its tokenomics while driving user engagement. The NUSD native stablecoin optimizes economic fluidity and enhances interactions within Web3 applications,

advancing the vision of a truly open internet.

1 Privacy-Preserving Social Networking

Endless provides technical support for privacy-focused social applications through DID, ZK-based third-party login components, and account abstraction on the Endless public blockchain. These components enable **decentralized encrypted data storage**, allowing users to fully control encryption keys and their data sovereignty, mitigating the risks of privacy breaches associated with centralized platforms.

- **DID Components** allow users to establish a unique digital identity that can be shared across multiple platforms. This enhances user retention and facilitates ecosystem-wide interoperability. Unlike traditional platforms, where users are locked into a specific service, DID enables seamless identity migration without losing network connections. Users can also bind their social media accounts and interact across multiple platforms.

- **Comprehensive Decentralized Social Networking**: Endless integrates multiple technical components to provide diverse functionalities in decentralized social networking, including content channels, wallet integrations, AI-powered emojis, private messaging, group chats, and public forums. Users benefit from embedded mini-apps that enhance visibility across platforms, providing a seamless cross-platform experience.

2 Short Videos

Traditional short video platforms are dominated by centralized platforms that retain the majority of their revenue, leaving content creators with limited earnings. Additionally, the absence of a structured asset rights system often

results in copyright disputes. To address these challenges, Endless Web3 Genesis Cloud' s DID components and token incentives **empower Web3 content creators with data ownership and fair revenue streams**.

- **NFT-Based Copyright Protection**: Web3 content economies enable creators to tokenize short videos as NFTs, allowing fans to purchase and gain access rights. This decentralized content storage and immutable blockchain tracing prevent unauthorized reuse. By utilizing Endless' blockchain, creators can efficiently resolve copyright disputes and ensure fair content attribution.

- **Incentive Mechanisms for Web2 Creator Migration**: Endless introduces a reward model for migrating Web2 creators into Web3, including watch-time rewards, engagement bonuses, and tokenized tipping. Users earn loyalty points or NUSD stablecoins that can be redeemed for platform services, products, or creator contributions, enhancing content monetization.

3 Music

Similar to short video platforms, Web3 music applications utilize blockchain technology to offer innovative revenue models and copyright protection, reducing the reliance on third-party intermediaries. This allows creators to monetize their work directly while ensuring transparent revenue distribution.

- **Decentralized Copyright Management**: Endless integrates decentralized contract execution layers for music copyright management, ensuring that revenue distributions occur automatically via smart contracts.

- **AI-Driven Music Composition**:

  - The AI components of Endless Web3 Genesis Cloud can generate melodies and arrangements based on thematic and emotional inputs from creators.
  - AI engines analyze large datasets of music compositions to extract and suggest creative patterns.
  - Multi-modal AI services automatically verify copyright ownership, providing protection against infringement.

- **Music Social Networking and NFT Economy**: The Endless Web3 music platform fosters direct interactions between creators and their fans while providing an NFT-based music asset issuance mechanism. This enables fans to become fractional owners of digital works. Additionally, the platform integrates interactive chat components, cross-platform content distribution for channels, multimedia creation SDKs, and DID-powered achievement incentive systems. These components collectively establish a super app ecosystem that blends music creation with social engagement. By leveraging social interactions, creators can gain fan support while achieving ongoing creative incentives via achievement-based rewards.

4 Cross-Border E-Commerce

Within the Endless ecosystem, the **NUSD native stablecoin** is issued using blockchain technology and employs multiple mechanisms—including over-collateralization, token incentives, clearing mechanisms, redemption processes, and arbitrage mechanisms—to ensure price stability. This allows NUSD to play a crucial role in the Web3 financial system.

- **Lower Transaction Costs and Improved Settlement Efficiency**: Traditional cross-border e-commerce transactions are often burdened with

high fees and exchange rate fluctuations. As a stablecoin, NUSD significantly reduces transaction fees while mitigating the costs associated with currency conversion fluctuations. Furthermore, blockchain-enabled transactions offer higher efficiency, enabling faster settlement and reducing transaction cycles.

- **Global Liquidity**: Thanks to blockchain technology, NUSD can circulate freely worldwide without geographic restrictions. This facilitates more convenient payments for global cross-border e-commerce transactions, promoting the development of international trade.

- **Blockchain-Enhanced Data Security**: The Endless public blockchain ensures transaction data traceability through distributed ledger technology, reducing fraudulent and counterfeit transactions at the source. Additionally, compared to traditional cross-border e-commerce platforms, Web3 and blockchain-based e-commerce platforms provide enhanced user privacy and data security, strengthening user trust in the ecosystem.

6.2.3 Financial Ecosystem

Endless provides application development solutions for financial innovations such as PayFi and RWA, enabling Web2 financial product developers to seamlessly transition into Web3 finance while enjoying an efficient development experience. Currently, stablecoins, PayFi, and RWA have emerged as prominent market narratives. By focusing on these three areas, the Endless financial ecosystem aligns with its mission of facilitating the migration of Web2 financial enterprises and users into Web3. Furthermore, it fully leverages Endless' technical expertise and resource advantages.

1 Stablecoin

The global stablecoin market is experiencing rapid growth, becoming increasingly significant in non-cryptocurrency ecosystems. Stablecoins not only serve as a medium of exchange in crypto transactions but are also expanding into broader use cases, particularly in cross-border payments and internal transactions within Web3 applications.

Utilizing smart contracts and an over-collateralization model, Endless will issue NUSD, the native stablecoin of the Endless public blockchain, to support the growth of the Endless ecosystem. This stablecoin is designed to enhance real-world Web3 transaction scenarios while delivering financial value to users.

Within the EDS ecosystem, NUSD offers low-cost transactions, rapid settlement times, and cross-chain compatibility, allowing it to support a diverse range of applications, including AIGC, privacy-preserving social applications, PayFi, RWA, cross-border e-commerce, music, short videos, and gaming. Additionally, NUSD is compatible with DeFi applications such as DEXs, lending, yield farming, and derivatives.

As a critical financial tool within the EDS ecosystem, NUSD not only meets the internal needs of Endless ecosystem participants but also enhances accessibility and usability for external users through cross-chain capabilities and low-cost payments. This feature reinforces NUSD's prominent role in the EDS ecosystem, offering both flexibility and stability.

2 RWA (Real World Assets)

RWA (Real World Assets) refers to the tokenization of real-world financial and tangible assets, enabling traditional financial instruments and economic assets to be mapped onto the blockchain. Currently, major RWA asset types include real estate, bonds, and commodities. As traditional financial institutions increas-

ingly engage with RWA, the market is expected to expand, offering investors more opportunities while improving asset liquidity, transparency, and composability to create innovative financial products.

In recent years, U.S. Treasury bonds and private credit markets have emerged as key segments within the RWA ecosystem, leading to higher standards in product design and risk management. However, several technical challenges remain, including asset valuation and certification, the security of smart contract execution, transaction efficiency, asset composability, ecosystem interoperability, and regulatory compliance—all of which require further exploration and refinement.

To address these issues, Endless provides RWA financial services for application developers and users, covering asset tokenization, investment management, and risk management. Web2 developers can participate in RWA product development without requiring extensive blockchain expertise. Additionally, Endless offers liquidity support based on the asset valuation models of RWA applications, utilizing the NUSD stablecoin as a key financial instrument.

Within RWA-enabled use cases on Endless' public blockchain, enterprises can tokenize their accounts receivables and freely trade or transfer them on the blockchain. This significantly enhances asset liquidity, allowing companies to accelerate receivable monetization and optimize asset structures. Additionally, this application fosters community interactions, integrating users into a global Web3 ecosystem. Instead of operating as isolated entities, users can become part of a dynamic and interconnected Web3 financial network.

3 PayFi

PayFi is an innovative financial concept that integrates payment and financial services, aiming to facilitate instant settlement and enhance payment efficiency. In addition to supporting stablecoin transactions, PayFi also enables

financial derivatives in the payment sector. With real-time settlement capabilities, PayFi effectively reduces transaction costs and improves liquidity, providing users with convenient and high-speed financial services. Furthermore, PayFi can complement traditional financial systems by addressing challenges such as long settlement cycles in cross-border payments and financing difficulties for small and medium-sized enterprises (SMEs).

The AI and payment components of the Endless Super Stack provide robust technical support for PayFi application development. Moreover, as the foundational asset for PayFi applications within the Endless ecosystem, NUSD significantly lowers transaction fees and enables real-time settlement via smart contracts. This enhances liquidity, improves the composability of financial applications within the Endless ecosystem, boosts transaction transparency, and reduces trust-related risks.

Although PayFi is still in its early stages, it holds vast market potential. Given the strong market demand and the technical advantages of the Endless ecosystem—particularly when combined with ecosystem-wide applications such as AI-driven creator economies, music, short videos, and cross-border e-commerce—Endless has identified PayFi as a strategic development priority and will provide significant ecosystem support for its expansion.

7 Endless and AI

7.1 Endless AI Ecosystem

With the rapid development of generative artificial intelligence (AIGC) technologies such as ChatGPT and DeepSeek, as well as advanced AI agents, AI is accelerating its role as a fundamental infrastructure for the next generation of the internet. Breakthroughs in artificial intelligence have significantly enhanced data analysis efficiency, decision-making accuracy, and content generation quality, driving industries towards intelligent transformation.

In the evolution of Web3 and the crypto-economic ecosystem, the integration of AI has become an irreversible trend. The two technologies are highly compatible in terms of open collaboration, data sovereignty, and digital nativity. AI can empower the Web3 ecosystem in key areas such as intelligent optimization, enhanced user experiences, and expanded application scenarios:

- **Enhancing the intelligence of decentralized applications (DApps)**: Improving user interaction experiences;
- **Accelerating generative content creation**: Expanding AI-driven decentralized social graphs and content ecosystems;
- **Smart finance and on-chain data analysis**: Optimizing DeFi strategies and blockchain market analytics.

The deep application of artificial intelligence in Web3 will further strengthen the developer aggregation effect of the Endless ecosystem and drive user growth.

7.1.1 Opportunities in the Convergence of Web3 and AI

As blockchain technology enters a phase of mature development, Web3 faces new challenges in data analysis and smart contract automation, where AI can provide groundbreaking solutions. Innovative user interaction methods are crucial in complex decentralized application scenarios. AI-powered Web3 can bring paradigm-level improvements to user experience, lower technical barriers for on-chain applications, and expand the user market. At the same time, Web3 can provide AI with core capabilities such as decentralized identity authentication, token incentives, digital asset ownership verification, and on-chain data access.

Although the convergence of AI and Web3 holds great promise, several challenges remain, including data silos and fragmented technology stacks:

- **AI agents face limitations in on-chain data operations**: While most AI systems now possess internet connectivity, cross-protocol and cross-chain data parsing complexity remains high, making it difficult for AI to accurately compute on-chain asset states or execute on-chain transactions.
- **Payment and settlement mechanisms are not yet well-developed**: AI agents need to perform on-chain payments (e.g., handling GAS fees), but traditional AI lacks the inherent capability to process cryptocurrencies, and standardized integration for crypto payments remains underdeveloped.
- **Ownership and value attribution issues for AIGC content remain unresolved**: The verification of ownership and revenue distribution of generative AI content requires improvement. Web3's token economy model

can provide a smart incentive loop, but related solutions are still in the exploratory stage.

7.1.2 Endless AI-Native Solution

As a Web3 infrastructure development platform, Endless positions itself as a bridge between Web2 and Web3 ecosystems, dedicated to the deep integration of AI and cryptographic technologies. Unlike traditional blockchain platforms, Endless has been optimized for AI requirements at the foundational architecture level, forming a unique AI-native solution:

- Utilizing an optimized data structure and consensus mechanism to enhance the execution efficiency of AI tasks on-chain;
- Developing the Web3 Genesis Cloud-Native Platform, integrating multi-modal AI modules to provide standardized on-chain intelligent services for decentralized application (DApp) developers;
- Advancing the bidirectional Web3-AI communication protocol stack, enabling AI agents to directly interact with on-chain smart contracts and interpret on-chain asset states.

In the future, Endless will continue to deepen AI support, building a scalable AI-Crypto interaction platform to lower the development threshold for Web3 intelligent applications and accelerate the evolution of AI agentic super-intelligent systems.

Endless proposes a dual-phase evolutionary path for AI and Web3 integration to construct an efficient and scalable on-chain AI ecosystem:

- **Phase One: Integration of Technical Architecture and Data Layer**: Establishing a cross-technology-stack Web3-AI interoperability protocol to

grant AI controlled on-chain operational permissions. This phase aims to enhance AI' s deep analysis of blockchain data, facilitating on-chain data invocation, smart contract interactions, and on-chain asset management.

- **Phase Two: AI-Agentic Super-Intelligent Systems**: Developing a decentralized AI agent network to enable coordinated decision-making, information sharing, and value transfer among AI agents on-chain, ultimately leading to the formation of AI-agentic super-intelligent systems.

Based on this technology blueprint, Endless is constructing a comprehensive technology matrix that encompasses the Web3-AI interoperability protocol stack, a full-stack AI toolchain, and developer-friendly infrastructure. This initiative aims to fully leverage AI' s bridging role in the crypto-economic system and accelerate the evolution of the next-generation intelligent blockchain ecosystem.

7.2 Endless AI Infrastructure System

The core technical requirements for AI infrastructure can be summarized into the following four key dimensions:

- **Computing Architecture and Scalability**: Meeting the demands of AI models for high-performance computing (HPC) and elastic scaling to enhance inference efficiency and response speed;
- **Security Architecture and Smart Contract System**: Establishing a dynamic smart contract framework that supports flexible iteration and deployment of AI algorithms while ensuring the security of the operating environment;

- **Developer Support System**: Providing standardized toolchains, open APIs, and community ecosystems to lower the technical barriers for AI + Web3 application development;
- **Cross-Chain Interoperability**: Creating a decentralized data access layer to enable seamless communication for AI agents across multi-chain environments, ensuring ecosystem scalability and technological evolution.

These technical elements form the core evaluation framework for crypto-intelligent project infrastructures. Endless holds a leading advantage in multiple key dimensions, providing comprehensive support for the integrated application of AI and Web3.

7.2.1 Intelligent AI-Web3 Interaction System

AI agents, as intelligent entities capable of environmental perception, autonomous decision-making, and execution, are gradually becoming the mainstream AI interaction paradigm. According to Gartner's research, by 2028, 15% of daily business decisions will be made by agent-based AI systems, underscoring their enormous potential in the Web3 domain.

However, AI adoption in the Web3 ecosystem still faces challenges such as data silos and technological fragmentation. Endless addresses these challenges by establishing a bidirectional AI-Web3 communication protocol stack, enabling intelligent parsing, interaction, and computation of on-chain data, thus providing the following key capabilities for decentralized AI ecosystems:

Multimodal AI Model Integration Framework

The Endless development platform natively integrates mainstream AI models such as ChatGPT, Stable Diffusion, and DeepSeek while also supporting in-

telligent agent frameworks like Eliza and Swarms. The platform provides standardized SDK interfaces, allowing developers to quickly leverage large language models (LLMs) to build crypto-native AI applications, enabling the intelligent upgrade of Web3 DApps.

Atomic AI Capability Component Library

The Endless AI Lab has developed a modular AI component library covering core functionalities such as natural language processing (NLP) and multimodal data analysis. Smart contract APIs grant AI systems permissions for on-chain operations, providing specialized AI modules for on-chain investment decision-making, decentralized data analytics, and more, forming a complete on-chain AI development stack.

On-Chain Data Communication Protocol

Endless has built a cross-chain data platform to standardize the access to on-chain transaction data, identity authentication, and smart contract execution records. The protocol translation layer ensures seamless integration between AI systems and smart contracts, bridging the value flow between crypto-economics and artificial intelligence, thereby enabling an AI-driven on-chain computing network.

Academic-Industry Collaborative Innovation System

Endless has formed a strategic partnership with the University of Surrey in the UK, integrating its cutting-edge research achievements in areas such as large language model optimization and real-time image generation. The University of Surrey has long been a top-ranking institution in artificial intelligence and computer science (CSR AI & Computing Science Ranking) within the UK,

providing continuous technological innovation support for the Endless ecosystem and advancing AI-Web3 integration.

7.2.2 AI Infrastructure Technical Architecture

High-Performance Transaction Engine

To accommodate the high-frequency interaction demands of AI systems, Endless has developed a high-throughput distributed ledger system capable of confirming transactions within 0.5 seconds, supporting tens of thousands of transactions per second with minimal fees. This creates a cost-efficient execution environment for large-scale deployment of AI agents.

Secure Smart Contract Architecture

Endless utilizes the Move programming language to develop its smart contract system, incorporating on-chain resource management and formal verification to ensure the security of digital assets. Its modular architecture supports the on-chain deployment of complex AI logic, while its resource isolation mechanism prevents smart contract vulnerability attacks, providing a trusted execution environment for AI agents and ensuring the security and stability of decentralized intelligent systems.

7.2.3 Developer Enablement System

Full-Stack Development Toolchain

Endless provides multi-language SDKs, including Python and JavaScript, and is compatible with mainstream AI development frameworks. This allows AI developers to build Web3+AI intelligent applications without requiring deep

knowledge of underlying blockchain technology, significantly lowering technical entry barriers.

Cross-Chain Interoperability Protocol

Endless Bridge enables seamless cross-chain asset transfer among major public blockchains, facilitating multi-chain AI data analysis. Through a standardized oracle interface, it seamlessly integrates off-chain AI models with on-chain data, ensuring the verifiability of AI computation results and fostering deep integration between the Web3 ecosystem and AI agent systems.

7.2.4 AI Ecosystem Cultivation Mechanism

Developer Growth Program

As a key enabling platform for the AI+Web3 ecosystem, Endless organizes quarterly AI hackathons with a million-dollar ecosystem fund to incentivize innovative developers and teams. Through initiatives such as technical mentorship and on-chain resource subsidies, Endless actively nurtures an AI agent development community, accelerating the maturity and adoption of decentralized AI technologies.

Specialized Acceleration Program

Endless has established a dedicated incubation support channel for AI-related projects, offering:

- **Funding Support**: An ecosystem fund to provide liquidity assistance for early-stage AI projects;
- **Regulatory Compliance Consultation**: Ensuring AI + Web3 solutions align with global regulatory frameworks to eliminate compliance barriers;

- **Project Rating System**: A data-driven on-chain rating mechanism to assess AI project quality, granting high-quality projects access to ecosystem traffic entry points and platform token liquidity support, thereby accelerating their market adoption.

Endless is committed to driving the large-scale adoption of Web3 technology. Through a highly scalable and high-performance infrastructure, combined with a low-code development paradigm and user-friendly interaction experience, the platform lays a solid technical foundation for the Web3 ecosystem. The vibrancy and diversity of applications within the ecosystem directly determine the commercial viability and sustainable development potential of AI agents.

Core Ecosystem Applications

The first wave of ecosystem applications on the Endless mainnet includes decentralized exchange (DEX) protocols and privacy-focused social platforms. Among them, the official strategic product **Luffa Social Protocol** provides:

- **End-to-End Encrypted Communication Framework**: Ensuring privacy security for on-chain social interactions;
- **AI Interaction Interface Infrastructure**: Enabling AI agents to directly interact with users, providing an efficient entry point for AI-driven Web3 social DApps;
- **Massive User Scalability**: A modular architecture supporting concurrent access by tens of millions of users, establishing a market-scale foundation for the AI-native Web3 ecosystem.

Endless' initial ecosystem covers key components such as decentralized trading protocols and privacy-focused social platforms. The flagship strategic product,

Luffa Social Protocol, integrates an end-to-end encrypted communication framework, allowing developers to build privacy-protected AI interaction interfaces and providing a large-scale user entry point for AI agent applications.

Through the coordinated optimization of infrastructure, tooling, and application layers, Endless constructs a comprehensive on-chain AI computing stack. The deep integration of DEXs, NFT platforms, and AI computing networks within the ecosystem generates a data-asset-intelligence interaction value multiplier effect, accelerating Web3's transition into the era of intelligent applications.

7.3 AI-Agentic Super-Intelligent System

With the technological foundation provided by the Endless platform, a future-oriented agentic super-intelligent system tailored for the Web3/Crypto domain will be developed. This system will facilitate the emergence of various AI agents within blockchain networks, enabling them to support cross-node interaction, information sharing, and autonomous decision-making.

Under the AI technology framework provided by Endless, the following two categories of on-chain AI applications will serve as the core components of this super-intelligent system:

Self-Iterative Smart Contracts Powered by AI Coders

By deeply integrating AI logic into smart contract architectures, Endless endows these contracts with adaptive and predictive analytical capabilities. Such smart contracts can dynamically interpret real-world data flows and user behavior patterns to optimize execution paths. Functioning like an AI coder operating 24/7, these smart contracts continuously enhance their functional modules, significantly improving application intelligence and user experience while reducing

operational costs.

On-Chain AI Agents With Autonomous Decision-Making Capabilities

Endless develops and integrates on-chain AI agents capable of autonomous task execution and direct blockchain network interactions. These agents can independently handle various complex operations, including asset trading, decentralized governance, digital asset management, intelligent content generation, and automated contract deployment. By leveraging machine learning to analyze user data characteristics and behavioral preferences, AI agents can offer highly personalized on-chain services.

With these fundamental technologies working in synergy, the developer community is expected to evolve innovative application scenarios such as:

Automated Smart Contract Governance: AI Judger

The AI Judger system continuously monitors, analyzes, and optimizes smart contract operations. By applying machine learning to historical transaction data and governance decision models, the system can dynamically predict optimal governance strategies. Decentralized autonomous organizations (DAOs) can deploy AI Judger to adjust voting weights, optimize fund allocations, and automate member management, thereby creating an efficient decentralized governance framework.

AI-Powered Content Creation Assistant

The Endless platform not only establishes a protocol bridge between Web2 and Web3 but also seeks to enable seamless integration between AI-generated content (AIGC) and the Web3 ecosystem. This technology empowers content creators by introducing novel business models and revenue channels, while also

fostering interdisciplinary applications in sectors such as education and finance, thereby creating a multidimensional application landscape and business value matrix.

Built upon Endless' blockchain-based AI infrastructure, this system integrates core technologies such as natural language processing (NLP) and computer vision engines to provide full-cycle support for content creators, including content generation, optimization, creative ideation, and automated content review mechanisms to detect non-compliant information and enhance content security. Precise user profiling further improves content recommendation accuracy—for example, in education, assisting teachers in developing personalized teaching plans and improving knowledge dissemination efficiency.

Additionally, users and AI artists can generate unique, digitally fingerprinted artworks by specifying artistic styles and thematic elements. Leveraging Endless' high-performance computing architecture and privacy protection protocols, the system ensures the efficiency and security of the creative process. AI artists can generate real-time digital art pieces for NFT auctions, virtual exhibitions, or digital collectibles, significantly amplifying creative productivity.

AI Financial Assistant

AI-powered payments represent a groundbreaking convergence of artificial intelligence and blockchain-based payment systems, significantly enhancing transaction efficiency, reducing operational costs, and generating user value expansion. AI agents can analyze user behavioral characteristics to provide customized payment strategies, optimize the cost structure of cross-border payment processes, and facilitate innovation in sectors such as e-commerce, digital finance, and intelligent retail. As AI payment technologies advance, data security mechanisms and privacy protection frameworks must also be enhanced, alongside continuous

optimization of blockchain payment system execution efficiency and cost structures.

The AI components within Endless employ a multi-agent collaborative architecture to support distributed task execution. For instance, market data analysis and exchange rate volatility prediction enable the Endless blockchain payment system to dynamically adjust transaction pricing models to mitigate exchange rate risks. Automated hedging mechanisms based on market sentiment analysis effectively reduce volatility exposure. AI agents use quantitative analysis to dynamically optimize payment exchange rates and transaction fees while employing transaction flow analytics to identify liquidity bottlenecks, continuously refining payment speed and cost efficiency.

Furthermore, AI agents can provide personalized financial services, including portfolio optimization, risk hedging strategies, and tax planning, based on users' financial profiles, risk tolerance levels, and market trends. Users benefit from 24/7 digital asset advisory services, enhancing asset allocation and strengthening financial security.

AI Social Assistant

The agent clusters within the Endless Web3 Genesis Cloud AI module incorporate deep learning frameworks and big data analytics engines, enabling highly accurate, user-profile-based social services. The system comprehensively analyzes user interest dimensions, geographic tags, social behavior patterns, and network topology to recommend valuable social connections, assisting users in building quality social graphs and offering intelligent support for relationship management. Additionally, the architecture supports virtual social spaces, allowing for the development of immersive social interaction environments.

AI agents are already playing a vital role in various social scenarios, such as

intelligent filtering and structuring of social information, as well as AI-powered chat companions that support multimodal user interactions with virtual characters. Moreover, AI agents assist users in the full cycle of social content creation, enhancing social influence and information dissemination efficiency.

AI Cross-Chain Gaming Assistant

This AI agent system operates seamlessly within cross-blockchain gaming ecosystems, providing strategic optimization recommendations, automated task execution (e.g., resource collection, tactical deployment), and cross-chain asset management functionalities. Players can leverage AI assistants to enhance their gaming experience and competitiveness, while the system continuously optimizes strategies through machine learning and supports automated participation in on-chain operations such as digital asset transactions and NFT auctions.

Driven by continuous innovation from developers and creator communities, the Endless platform will continue to foster new AI agent applications. The deep integration of artificial intelligence with blockchain technologies will expand the application boundaries of blockchain, accelerate the evolution of the Web3 ecosystem, and usher in paradigm shifts in user experience. By blending the strengths of AI and blockchain, we anticipate the emergence of increasingly innovative, highly automated, and user-friendly next-generation decentralized application solutions.

Endless has not only built a high-performance blockchain infrastructure but has also designed a full-stack ecosystem optimized for artificial intelligence projects. The platform provides a comprehensive suite of solutions covering AI toolchains, distributed computing resources, and developer ecosystem support. These core elements collectively establish Endless as the leading development platform for crypto-artificial intelligence (Crypto AI) projects, setting a benchmark in the sector.

8 Governance and Risk Management

8.1 Endless Project Governance Structure

The governance mechanism of Endless is designed to ensure the decentralization and transparency of the network while fostering sustainable development through extensive community participation. To support the long-term growth and ecosystem development of the network, Endless has established a community governance fund, sourced from the early token distribution. The use of the community fund is subject to governance voting to ensure fairness, transparency, and democratic decision-making.

Endless adopts an on-chain governance mechanism, where holders of staked EDS tokens can participate in decision-making through voting. The voting power of each participant is proportional to the amount of EDS tokens they hold. The scope of governance voting covers, but is not limited to, the following areas:

- Adjustments to network parameters (such as inflation rate, transaction fees, etc.);
- Network upgrades and technical improvement proposals;
- Allocation of funds and ecosystem support projects.

Endless follows a systematic governance process when implementing significant functional changes and optimizations, which involves multiple stages, in-

cluding proposal submission, implementation, testing, and deployment. This governance mechanism provides stakeholders with the opportunity to express opinions, raise concerns, and propose suggestions to ensure continuous network optimization and decentralized management. As a result, the governance of the Endless ecosystem not only guarantees broad community participation but also enhances the scientific rigor and executability of governance decisions. The specific governance process is illustrated in the figure below.

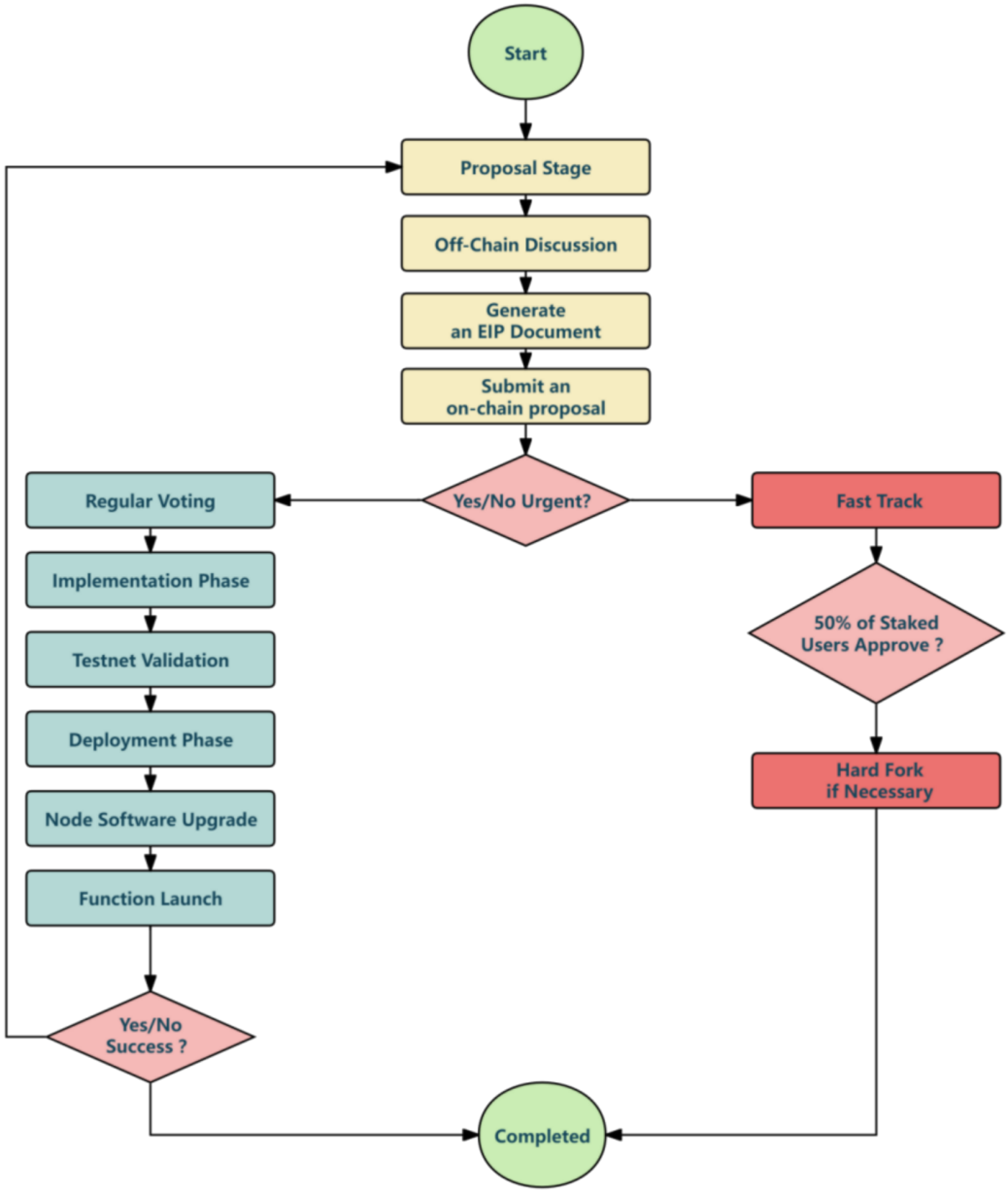

Figure 8.1: Endless Governance Process Diagram

As an open-source blockchain project, Endless relies on strong community feedback and on-chain governance to manage key processes. As the ecosystem evolves and improves, on-chain governance will play an increasingly vital role in

protocol upgrades and change management, thereby reducing reliance on off-chain interventions and enhancing the automation and autonomy of governance.

8.2 Risk Management Strategies

1 Technical Risks

Technical risk management primarily focuses on the following three core areas.

First, consensus mechanism risks, including 51% attacks, fork risks, and malicious node activities. To mitigate these risks, Endless implements a dynamic difficulty adjustment mechanism, deploys a distributed node monitoring system, and establishes a rapid response mechanism for fork handling to enhance network security and stability.

Second, smart contract risks, which mainly involve code vulnerabilities, reentrancy attacks, and logical flaws in business processes. To reduce potential risks, Endless enforces formal verification as a mandatory process, conducts multiple layers of security audits, and implements a smart contract upgrade mechanism to strengthen contract security and maintainability.

Moreover, performance risks are a critical aspect of technical management, including TPS (transactions per second) bottlenecks, network congestion, and storage expansion challenges. To optimize performance, Endless plans to implement sharding technology, deploy Layer 2 scaling solutions, and optimize data storage structures. Additionally, Endless will employ real-time monitoring of system performance to quickly identify and address potential technical bottlenecks, ensuring stable network operation under high-load conditions.

2 Security Risks

Endless may face security threats such as smart contract vulnerabilities, DDoS (Distributed Denial-of-Service) attacks, and consensus mechanism attacks. If these risks are not identified and mitigated in a timely manner, they could result in financial losses, data breaches, or network outages.

To counter these risks, Endless adopts the following strategies:

- Conducting regular security audits, including code audits, smart contract assessments, and network security evaluations to ensure the integrity and security of all components.
- Deploying traffic filtering systems, implementing node bandwidth limitations, and establishing a P2P network firewall to reduce the impact of external threats.
- Enhancing application-layer security by utilizing zero-knowledge proofs, deploying multi-layer access control mechanisms, and establishing a privacy-preserving computation framework to defend against API vulnerabilities, authentication flaws, and data privacy breaches.
- Establishing a bug bounty program to encourage global developers and security experts to identify and report potential vulnerabilities, ensuring timely remediation of security issues.

3 Legal Risks

As blockchain technology continues to evolve, regulatory policies for decentralized technologies may change across different jurisdictions. During its global expansion, Endless may encounter legal and compliance challenges in various

countries and regions, such as changes in regulations concerning data privacy protection, Anti-Money Laundering (AML) laws, and securities laws.

To ensure compliance, Endless employs the following strategies:

- **Legal Advisory Team**: Establishing a professional legal advisory team to continuously monitor regulatory policy changes worldwide and ensure protocol compliance across different jurisdictions.
- **Flexible Compliance Strategy**: Adapting operational models and product designs based on jurisdiction-specific legal requirements. For instance, providing localized services and compliance reports to ensure adherence to local regulations.
- **International Collaboration**: Engaging with regulators across different countries to ensure global compliance while actively promoting the development and implementation of blockchain-friendly policies.

9 Roadmap and Future Outlook

9.1 Roadmap

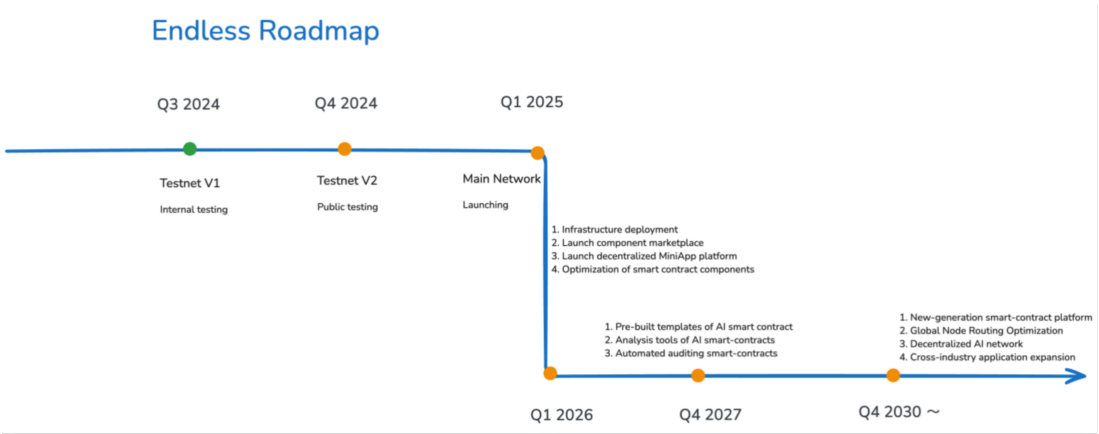

Figure 9.1: Endless Project Development Goals and Key Milestones

9.1.1 Short-Term Plan (1-2 Years)

1 Key Areas of Development and Operations

- **Optimization of Modular Component Protocols**: Deepen the standardization of component interface designs and optimize component performance to enhance flexibility and scalability, allowing adaptation to diverse application scenarios.

- **Expansion of the Component Ecosystem**: Enrich the core component protocol library of the Endless ecosystem, supporting external developers in building diverse, high-demand functional components. Examples include the introduction of EDS domain name registration components, social growth components, task management components, crowdfunding and gaming components, and content channel components targeting the creator economy.

- **Optimization of Smart Contract Components**: Provide modular smart contract templates with one-click deployment and non-custodial deployment capabilities, improving component composability while simplifying the development and deployment process. This lowers the entry barrier and enhances developer efficiency.

- **Integration of Zero-Knowledge Proof and DID Identity Verification**: Develop and integrate identity verification mechanisms based on zero-knowledge proofs, utilizing Decentralized Identity (DID) technology to streamline authentication processes while enhancing user experience consistency and security.

- **Expansion of Cross-Chain Compatibility**: Develop and integrate cross-chain bridge tools to facilitate free transfer and invocation of cross-chain assets and smart contracts. Additionally, Endless will participate in the standardization and promotion of cross-chain interoperability to ensure high compatibility between Endless and other blockchain networks, thus fostering a collaborative cross-chain ecosystem.

- **Decentralized Mini-Application Platform**: Build a decentralized mini-application platform that allows developers to create and deploy mini-apps

within the Endless ecosystem, improving user experience while promoting the adoption of decentralized applications. Furthermore, this platform will support seamless operation and migration of mini-apps across various blockchain applications and platforms, enhancing cross-platform usability and application flexibility.

- **Support for Additional Programming Languages**: Expand support to mainstream programming languages such as Python and Rust, increasing the flexibility of technology choices for developers. Additionally, Endless will introduce corresponding Software Development Kits (SDKs) for each language to optimize the development process and facilitate faster integration with the Endless ecosystem. Moreover, multilingual technical documentation and development tutorials will be provided to lower the entry barriers for developers with different language backgrounds.

2 Short-Term Goals and Expected Outcomes

- **Official Launch of the Component Marketplace**: Develop an efficient marketplace for components and introduce a series of core functional components to attract more developers to the Endless ecosystem, driving the rapid development and deployment of decentralized applications.

- **Optimization of Smart Contract Components**: Simplify the development and deployment process of smart contracts by providing modular smart contract templates (such as ERC-20, ERC-721, and ERC-1155) with one-click deployment support across major blockchain platforms, increasing project flexibility and usability.

- **Infrastructure Deployment**: Complete cross-chain integration with major public chains such as Ethereum, enabling cross-chain asset transfers and

smart contract interactions, laying a solid foundation for future cross-chain applications.

- **Launch of the Decentralized Mini-Application Platform**: Develop an easy-to-use decentralized mini-application platform, allowing traditional mini-app developers to seamlessly migrate their applications to the Endless ecosystem. Additionally, the platform will support new developers in building DApps with minimal technical barriers. Users will be able to access and use decentralized applications seamlessly via mini-apps, improving blockchain adoption and usability.

9.1.2 Mid-Term Plan (3-5 Years)

Mid-Term Expansion Plan

- **AI-Driven Pre-Built Smart Contract Components**: Incorporate AI technology to develop AI-powered pre-configured smart contract templates, intelligent configuration suggestion systems, and automated deployment tools. These enhancements will simplify the smart contract creation and deployment process, improve development efficiency, and reduce the potential for errors.
- **AI-Enhanced Smart Contract Analysis**: Build AI-powered smart contract analysis modules that offer intelligent optimization suggestions to improve code quality and execution efficiency. Additionally, introduce continuous monitoring functionality to enhance security, stability, and overall contract robustness while lowering technical barriers for developers.
- **Automated Smart Contract Auditing**: Develop an AI-driven automated smart contract auditing framework covering code analysis, security verification, and contract performance evaluation. The framework will

also generate automated audit reports that provide comprehensive security assessments and improvement recommendations, enabling developers to quickly address potential issues. By strengthening automated auditing capabilities, contract security will be significantly improved while reducing reliance on costly, time-consuming manual audits.

9.1.3 Long-Term Plan (Beyond 5 Years)

1 Long-Term Development Goals

- **Next-Generation Smart Contract Platform**: Introduce a multi-layer smart contract architecture supporting multi-dimensional interoperability between contracts, enabling developers to create complex cross-chain and cross-industry business logic. Additionally, develop a smart contract orchestration engine to support dynamic contract composition, execution sequence management, and concurrent processing. Furthermore, a new high-performance Virtual Machine (VM) will be introduced to optimize smart contract execution efficiency and reduce resource consumption, thereby building a highly flexible and efficient smart contract platform to support complex business logic and cross-industry applications.

- **Expansion into Cross-Industry Applications**: Develop specialized modular components tailored to industry-specific needs, allowing enterprises to integrate and leverage the Endless ecosystem more effectively. Collaborations with leading industry players and standardization organizations will drive the development and promotion of industry standards, ensuring consistency and interoperability in various sectors. Key areas of focus will include finance, healthcare, supply chain management, and energy, fostering the widespread adoption of Endless across multiple industries.

- **Global Node Routing Optimization**: Introduce intelligent node routing algorithms that dynamically adjust data transmission paths based on real-time network conditions. Additionally, network configurations and data transmission strategies will be optimized for different geographic regions. These measures will significantly enhance Endless' s global node network performance, ensuring more efficient data synchronization and processing, thereby supporting large-scale deployment of decentralized applications and providing high-quality network services and application experiences for global users.

- **Decentralized AI Network**: Develop a decentralized AI model training framework that supports distributed AI training across the global node network. Additionally, establish a decentralized AI model marketplace to facilitate transactions and sharing of AI models among developers and enterprises, fostering the integration of AI technology into the Web3 ecosystem. Ultimately, Endless aims to create a decentralized AI network that deeply integrates AI with blockchain technologies to drive intelligent upgrades in smart contracts, data analysis, and business decision-making applications.

2 Future Innovation Plans

- **Deep Integration of AI and Web3**: Promote the development of a decentralized AI network that fosters deep integration between AI and blockchain technology, driving intelligent transformations in smart contracts, security auditing, data analytics, and decision support.

- **Global Node Network Expansion**: Further optimize and expand the global node network of Endless to enhance data synchronization and processing capabilities, ensuring large-scale deployment and operation of de-

centralized applications.

This chapter provides a detailed overview of the development goals and key milestones of the Endless project, aiming to strengthen investor and user confidence in its growth potential while clearly conveying its strategic direction. In the short term, Endless will rapidly establish its initial ecosystem through the launch of the component marketplace and infrastructure deployment. In the mid-term, the introduction of AI-driven enhancements and cross-chain functionalities will further improve user experience and market coverage. In the long run, continuous technological innovations and global ecosystem expansion will ensure Endless maintains a leadership position in the Web3 domain.

9.2 Future Outlook

9.2.1 Technological Prospects

The core objective of Endless is to establish unified development protocols and standards to simplify the Web3 application development process. These standards not only ensure cross-platform compatibility and interoperability but also provide clear guidance for developers, enabling them to focus on innovation and functional implementation without being burdened by the complexities of the underlying infrastructure.

To achieve this goal, Endless will offer user-friendly tools and development frameworks to facilitate the seamless integration of traditional Web2 applications with decentralized Web3 technologies. This bridging mechanism will create a familiar yet innovative user experience, effectively lowering the technical barriers to Web3 adoption and accelerating its widespread implementation.

By promoting standardized development protocols and best practices, End-

less aims to drive the standardization of Web3 projects, ensuring that key aspects such as security, scalability, and user experience meet industry-leading standards. Endless will evolve into the preferred infrastructure for developers building Web3 applications, providing an all-in-one development solution that simplifies development workflows and accelerates application deployment and adoption.

Furthermore, Endless will continuously explore the potential applications of cutting-edge technologies such as AI, zero-knowledge proofs, and privacy protection within the Web3 space. The integration of these advanced technologies will not only enhance user experience, strengthen data security, and optimize contract execution efficiency but also foster greater community participation. This will solidify Endless' s competitive edge within the digital economy, attracting more users and partners to build a self-sustaining decentralized ecosystem.

9.2.2 Web3 Innovation and Expansion

Endless' s future innovation and expansion plan in the Web3 domain aims to accelerate the adoption and development of Web3 technologies. The focus will be on lowering the barriers for Web2 users migrating to Web3, establishing an accessible component marketplace, enabling seamless cross-chain interactions, enhancing core functionalities, and fostering ecosystem growth. Below is a detailed overview of these initiatives.

1 Facilitating Web2 User Migration to Web3

One of Endless' s primary goals is to reduce the barriers to entry for Web2 users transitioning to Web3. To achieve this, Endless will introduce a range of user-friendly tools and services, ensuring a smooth transition into the Web3 ecosystem while helping users quickly adapt to a decentralized experience.

2 Establishing a Low-Barrier Component Marketplace

Endless plans to create an accessible component marketplace offering a wide range of decentralized application (dApp) modules and tools to enhance interaction between developers and users. This open marketplace will allow:

- Developers to discover and reuse existing Web3 components, smart contracts, APIs, and development tools, significantly reducing the time and technical overhead required for application development.
- The platform to encourage developers to upload and share their self-developed components, fostering a thriving community-driven ecosystem.
- Users to select the most suitable components based on reviews and usage feedback, improving the overall development and application experience.

3 Enabling Seamless Cross-Chain Interactions

As the blockchain ecosystem continues to evolve, the demand for cross-chain interactions is growing. Endless aims to enhance multi-chain compatibility through the following initiatives:

- Developing cross-chain asset interoperability protocols to facilitate seamless asset transfers across multiple blockchains.
- Establishing cross-chain smart contract interoperability standards to enable smart contract interactions between different blockchain protocols.
- Ensuring that the Endless ecosystem seamlessly connects with major blockchain networks to eliminate the fragmentation of isolated blockchain ecosystems, ultimately fostering an interconnected Web3 environment.

4 Implementing Enhanced Functional Expansions

To accommodate growing market demands, Endless plans to introduce a series of advanced functional features:

- **Dynamic Smart Contract Adjustment Mechanism**: Introducing self-adjusting smart contracts that can dynamically optimize execution logic based on real-time data, reducing manual intervention and enhancing system intelligence.
- **Optimized Development Environment**: Providing an integrated development environment with support for multiple mainstream programming languages (such as Python, Rust, and Solidity), making it easier for developers to get started and efficiently build dApps.
- **Comprehensive Testing and Debugging Tools**: Launching a full suite of smart contract testing and debugging tools to help developers thoroughly validate their code for security and stability before deployment.
- **Automated Deployment and Operational Support**: Offering an all-in-one automated deployment solution along with operational management tools, streamlining the application launch and maintenance workflow, reducing operational costs, and improving the developer experience.

These functional expansions will significantly enhance developer creativity and productivity, leading to the emergence of more high-quality dApps and driving the rapid evolution of the Web3 ecosystem.

5 Ecosystem Development Plan

The Endless ecosystem development plan is designed to establish a powerful and sustainable Web3 ecosystem, encompassing the following key initiatives:

- **Developer Ecosystem Support**: Providing financial assistance, technical training, hackathons, and resource-sharing opportunities to cultivate an active developer community, encouraging deeper engagement with Web3 technologies.

- **Community-Driven Growth**: Endless places great emphasis on community feedback and user needs, implementing a transparent governance mechanism that allows users and developers to directly influence platform optimizations and ecosystem growth. Furthermore, a decentralized governance model will be adopted to strengthen community cohesion and participation.

- **Cross-Industry Collaboration and Ecosystem Alliances**: Endless will actively seek strategic collaborations with industry leaders across various sectors, including finance, gaming, social networks, and supply chain management. Cross-industry partnerships will drive technological integration and real-world adoption, unlocking new business opportunities and creating enhanced user experiences within a diversified ecosystem.

- **Building a Sustainable Business Model**: Endless will explore diverse business models such as subscription services, transaction fees, and component marketplace revenue-sharing to ensure long-term economic sustainability. Additionally, incentive mechanisms and community governance will be employed to encourage user and developer participation in ecosystem construction and revenue distribution, further reinforcing stability and long-term growth.

Looking forward, Endless will remain deeply focused on user needs and industry trends, dynamically adjusting its strategy and product roadmap to maintain technological leadership within the rapidly evolving Web3 ecosystem. As Web3

technologies continue to mature and their adoption scenarios expand, Endless aspires to position itself as a core force driving this new decentralized paradigm, promoting large-scale adoption of decentralized applications, and shaping a more open, fair, and transparent digital economy.

9.2.3 Global Market Expansion

Endless aims to accelerate its global market expansion by establishing a global network of nodes and actively engaging with the global developer community. This approach will enhance its ecosystem' s influence and competitiveness. Below are the details of Endless' s market expansion strategies and their far-reaching impact on its global competitiveness.

1 Establishing a Global Node Network

Endless plans to deploy more distributed nodes across key global markets such as North America, Europe, and the Asia-Pacific region to ensure high availability and low latency while optimizing the access experience for users worldwide. By setting up nodes in different geographical regions, Endless will deliver more stable and efficient services, thereby attracting a larger number of users and enterprises.

Additionally, Endless will expand into emerging markets such as Southeast Asia and Africa to capture the rapidly growing digital demand in these regions. By building a globally distributed node network, Endless aims to establish a reliable and high-performance decentralized infrastructure that supports the large-scale development of the Web3 ecosystem.

2 Engaging the Global Developer Community

Endless will introduce an open developer platform to attract global developers to participate in ecosystem development, driving technological innovation and application deployment. The core strategies include:

- **Providing a Comprehensive Set of Development Components and Tools**: Supporting developers in efficiently creating decentralized applications (dApps), lowering development complexity, and fostering innovation and ecosystem diversity.
- **Hosting Global Hackathons and Technology Summits**: Regularly organizing global tech events to engage developers, enterprises, and industry experts, driving the continuous evolution of the Endless ecosystem.

These initiatives will not only enhance the vibrancy of the Endless developer community but also introduce fresh ideas, technical solutions, and high-quality applications into the ecosystem.

3 Strengthening Community Engagement and Incentive Mechanisms

To encourage active community participation, Endless will implement a decentralized community governance model, enabling community members to take part in decision-making and fostering a greater sense of belonging. The key measures include:

- **On-Chain Governance**: Allowing community members to vote and propose governance decisions on critical project directions, enhancing transparency and credibility.
- **Incentive Mechanisms**: Establishing reward programs, including token incentives, ecosystem fund support, and joint investment plans, to attract

talented individuals and contributors to drive ecosystem innovation.

- **Developer Incentives**: Encouraging developers to contribute by creating components, improving protocols, and building applications, thereby enhancing the ecosystem' s vitality and technological competitiveness.

These incentives will not only foster the development of the Web3 ecosystem but also strengthen Endless' s influence within the global developer community.

4 Enhancing Marketing and Brand Awareness

Endless will implement a global, multi-channel marketing strategy to boost brand awareness and user outreach:

- **Social Media and Digital Marketing**: Leveraging platforms such as Twitter, Telegram, and YouTube to expand the global Endless community.
- **Industry Conferences and Strategic Partnerships**: Collaborating with international tech expos, blockchain summits, and fintech forums to establish connections with industry experts and enterprises.
- **Collaborations with Universities and Enterprises**: Partnering with leading universities and research institutions worldwide to advance talent development, cutting-edge research, and technology adoption.
- **Localized Market Strategy**: Tailoring marketing campaigns to different regions to ensure product and service optimization for local user needs, enhancing user engagement and market penetration.

These marketing strategies will further strengthen user recognition of the Endless ecosystem, positioning it as a key driver of the global Web3 industry.

5 Ensuring Data Security and Global Compliance

During its global expansion, data security and compliance will remain top priorities for Endless. The company will adopt the following measures to ensure global user data security while adhering to regulatory requirements:

- **Data Privacy and Security Protection**: Utilizing advanced encryption technologies and zero-knowledge proof solutions to ensure user data security and regulatory compliance.
- **Compliance Audits**: Adhering to internationally recognized data compliance standards such as GDPR (General Data Protection Regulation), AML (Anti-Money Laundering), and KYC (Know Your Customer) policies to ensure the ecosystem' s legal and regulatory compliance.
- **Strategic Compliance Planning**: Adapting business models flexibly to accommodate the regulatory landscapes of different countries and regions, minimizing compliance risks while strengthening global market trust.

Through these market expansion strategies, Endless will progressively establish a global node network, attract deep engagement from global developers, and reinforce its ecosystem' s influence. With strong community-building and incentive mechanisms, extensive market promotion strategies, and stringent data security and compliance measures, Endless will continue to enhance its global competitiveness and demonstrate significant market growth potential.

As the world's first distributed cloud intelligent component protocol platform, Endless Web3 Genesis Cloud is built upon an innovative technology architecture and a comprehensive ecosystem framework, dedicated to promoting the widespread adoption and development of Web3 technologies. We firmly believe that as super applications such as private social networks, short videos, music,

and cross-border e-commerce continue to evolve, Endless will play a critical role in transitioning Web3 from speculative financial instruments to real-world applications with tangible value.

In the upcoming ***Endless Technical White Paper***, we will provide in-depth insights into the core technological innovations and solutions of the Endless ecosystem, including distributed storage architecture, zero-knowledge proof technology, smart contract optimization, cross-chain protocols, and AI integration strategies. We look forward to collaborating with global developers, project teams, and users to jointly build a truly open, secure, and efficient Web3 world, driving the digital economy toward an entirely new era.