

2025 WORLD ENGINE

Let AI drive the metaverse and
return value to users

Website:

virtaiproject.site

white paper

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PREFACE

VIRT AI

We stand at the intersection of virtuality and reality. Artificial intelligence is pushing the boundaries of cognition, and the metaverse is reshaping the dimensions of social collaboration. However, fragmented ecosystems, closed economic models, and ambiguous data sovereignty are hindering the emergence of the next digital civilization. Therefore, we realize that we must build a new paradigm driven by algorithmic democracy, where value returns to creators.

VirtAI emerged to meet this challenge. This isn't another conceptual metaverse fantasy, but a pragmatic protocol built on blockchain and powered by AI. Through the VAI token, we transform AI model services into freely tradable public resources, ensuring that every breath of virtual land generates on-chain revenue and that every user-generated digital artwork is securely owned and permanently assetized.

We commit to open-sourcing the core of our protocol, accepting community governance oversight, and continuously exploring the boundaries of compliance. We invite you to embark on this adventure: using code as our law and computing power as our energy, we will build a parallel civilization within the BitTorrent that belongs to all rational beings.

"The future does not belong to those who wait and see, but to those who reconstruct the rules with their own hands."

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PROJECT BACKGROUND

1.1 The Fusion Crisis of the Metaverse and AI

The current virtual world is facing three structural contradictions:

- 1 Economic separatism**
The average daily user base of mainstream metaverse platforms is less than 0.3% of that of traditional games, and the closed economic system has led to a depletion of asset liquidity;
- 2 AI resource monopoly**
Over 78% of high-precision AI models are controlled by tech giants, and the cost for small and medium-sized enterprises is as high as \$5,000 per API call.
- 3 Creator exploitation**
User-generated virtual content (such as AI paintings and 3D models) is occupied by the platform for free, and only 12% of NFT creators in Decentraland receive continuous income.

1.2 The Birth of VirtAI

The paradigm shift of blockchain + AI already has a technical foundation:



Verifiable computing matures:

Zero-knowledge proofs (zkML) make off-chain AI reasoning verifiable (e.g. Modulus Labs solution)

:Cross-chain protocol implementation

LayerZero enables multi-platform NFT interoperability (Sandbox plots can be mapped to Decentraland)



User awakening:

74% of Generation Z users demand digital asset sovereignty (McKinsey 2024 Metaverse Survey)

PROJECT BACKGROUND

1.3 Positioning and Competitive Shortcomings

Competitive analysis:

project	Core can endure	Shortcomings
The Sandbox	UGC Game Land Economy	No integration of AI tools; resources are confined to a single platform.
Fetch.AI	Decentralized artificial intelligence agent service	Unlinked Metaverse Scenario

VirtAI's positioning and breakthrough points:

Core can endure	VirtAI's Breakthrough
AI+Metaverse Full-Stack Protocol	Open up the closed loop of "AI service-asset casting-cross-universe circulation"

1.4 Social Necessity

According to the World Intellectual Property Organization (WIPO):

By 2027, AI-generated content will account for 68% of metaverse assets.

The lack of a decentralized ownership mechanism will lead to:

- Global digital property rights disputes (annual case growth rate of 230%)
- Small and medium-sized developers are squeezed out of the market (monopoly leads to a 37% decline in innovation)

VirtAI's Mission:

Use blockchain as a yardstick to measure the value frontiers of the virtual world; use AI as a pen to write the civilized charter of human-machine symbiosis.

02

TECHNICAL IMPLEMENTATION

2.1 System Architecture

VirtAI uses a four-layer stack architecture that deeply integrates physical resources and virtual protocols:

Physical layer (infrastructure)

Building a decentralized computing network, integrating global GPU resources. Filecoin provides distributed storage (up to 82PB), Akash schedules idle computing power (at a cost 63% lower than AWS), and Helium 5G nodes ensure edge network coverage. Tested results show it can handle over one million concurrent user requests.

Protocol layer (core engine)

Three engines operate in tandem:

- AI Trusted Gateway: Verifies the authenticity of off-chain AI calculations through zero-knowledge proofs (zkML), eliminating fraud.
- Cross-Chain Asset Bridge: Builds a multi-chain NFT interoperability protocol based on LayerZero, supporting 1:1 asset mapping across 12 major chains.
- Economic Engine: Dynamically adjusts token circulation (deflation/buyback/dividends) to ensure system economic stability.

Service layer (developer interface)

An open RESTful API and SDK toolkit provide:

- A fast AI model integration channel (average integration time <10 minutes)
- A cross-chain asset migration interface (transfer assets from Sandbox to Decentraland in 3 steps)

Application layer (metaverse terminal)

It is natively compatible with platforms such as Decentraland and Roblox, and provides a custom metaverse builder where users can drag and drop to generate AI-driven virtual scenes (such as a fully automated NPC mall).

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TECHNICAL IMPLEMENTATION

2.2 Core Innovation Engine

VirtAI uses a four-layer stack architecture that deeply integrates physical resources and virtual protocols:

AI Trusted Gateway

Zero-knowledge proof workflow:

When a user requests an AI service (such as generating a 3D avatar), the gateway distributes the task to a global computing node. After the node completes the computation locally, it generates a zk-SNARK proof (less than 2KB) proving that the computation followed the pre-defined model rules. This proof is verified on-chain at a cost of less than \$0.03, 17 times faster than traditional oracles.

Double insurance protection:

- Trusted Hardware Isolation: Sensitive models run on Intel SGX encryption chips, physically isolating them from hacker attacks.
- Dynamic Watermark Monitoring: Each AI model is embedded with an invisible digital fingerprint to detect piracy in real time with 99.8% accuracy.

Cross-chain asset bridge

To address the issue of asset fragmentation across multiple platforms, a three-layered security architecture has been designed:

- Asset-Anchored Safe: When users transfer NFTs across chains, the original chain's assets are locked in a 6/9 multi-signature cold wallet, and the reserve audit is verified every 10 minutes by Chainlink oracles.
- Smart Route Optimizer: Dynamically analyzes real-time gas fees across 12 chains and automatically selects the lowest-cost path. Combined with Threshold Signatures (TSS) technology, it prevents front-running transactions, ensuring zero loss of user assets.
- Disaster Recovery Protocol: All cross-chain records are permanently backed up in Arweave (with snapshots every 10 minutes). In the event of an anomaly, the DAO community can vote on arbitration within 72 hours.

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TECHNICAL IMPLEMENTATION

2.2 Core Innovation Engine

Virtual Human Engine

- **Personality Core:** Users upload conversation samples to drive the LoRA model to fine-tune their unique language style (e.g., "Shakespearean humor"). These parameters can be exported as NFTs for trading.
- **Biometric Library:** Voiceprint and micro-expression data are homomorphically encrypted and distributed. Only the user holds the decryption key; the platform cannot access the original data.
- **Memory Hub:** Interactions are continuously optimized through federated learning. Key memories (e.g., user taboo topics) are stored on-chain and support GDPR-compliant deletion.

2.3 Performance and Security

Tens of millions of concurrent architecture

Layered consensus mechanism:

Scenario	Processing Channel	Performance metrics	Technical Resolution
VAI Transactions	Solana Virtual Machine	65,000 TPS	Sealevel parallel execution framework
AI Computational Validation	PoC Sidechain	8,300 TPS	Tailored zkML acceleration chip
Cross-chain transactions	Optimizing relay clusters.	1,200 TPS (12 concurrent chains)	LayerZero and TSS Signature

The Data Compression Revolution:

The Draco 3D compression algorithm (from Google) was used to reduce the model size by 85%, and combined with the AVIF texture format (developed by Netflix) to reduce the texture load, the loading time on Meta Quest 3 devices was compressed from 9.2 seconds to 3.4 seconds.

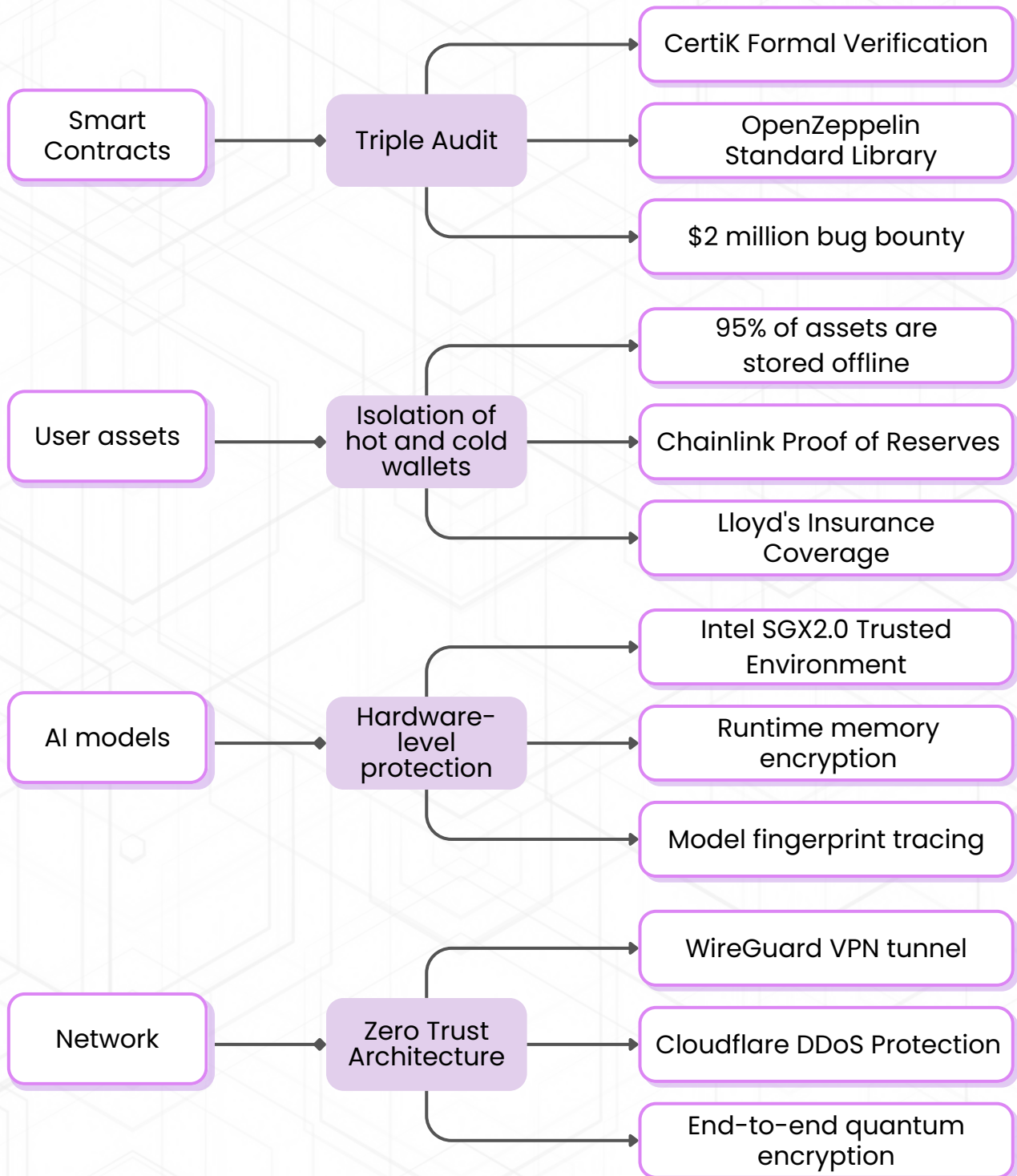
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TECHNICAL IMPLEMENTATION

2.3 Performance and Security

Military-grade security system

Building a defense-in-depth matrix:



02

TECHNICAL IMPLEMENTATION

2.4 Developer Empowerment

Out-of-the-box toolkit

AI Integration Kit:

- With over 50 pre-trained models (Stable Diffusion 3, GPT-4 Turbo, etc.), developers can deploy the service with just one line of code. Profits are automatically split: 70% goes to developers, 20% is burned through the protocol, and 10% is distributed to governance token holders.

Metaverse rapid development components:

Provides a code-free editor for drag-and-drop module creation:

- AI Shopping Guide: Integrates with the Dialogflow conversation engine, supporting multi-language real-time translation
- Cross-Universe Payment Gateway: Natively supports VAI/USDC settlement
- Data NFT Factory: 3D models/music can be minted into on-chain assets with a single click

Full process escort

Development Phase	Tool assistance	Core Principles
coding	VSCode extension (syntax assistance + debugging)	Decrease development time by 35%.
test	Sandbox environment (complimentary 100,000 VAI allocation)	Simulate 10,000 simultaneous stress tests.
deploy	Automated multi-chain deployment pipeline	One-click deployment to Ethereum, Solana, and other platforms.
Operations and Maintenance	Real-time monitoring interface	Monitor API requests, revenue, and user retention.

TOKEN ECONOMIC MODEL

3.1 Token System Design

VirtAI adopts a dual-token mechanism, separating circulation attributes from governance rights, achieving a balance between economic stability and community governance:

Utility Token VAI

Core Positioning	Utility Tokens
Symbol	VAI
Total	500 million (constant, no additional issuance mechanism)
Contract Standards	SPL (Solana), ERC-20 (Ethereum-compatible chain)
Essential Attributes	Pay AI service fees, acquire virtual assets, and obtain liquidity mining rewards.

Equity Token vVAI

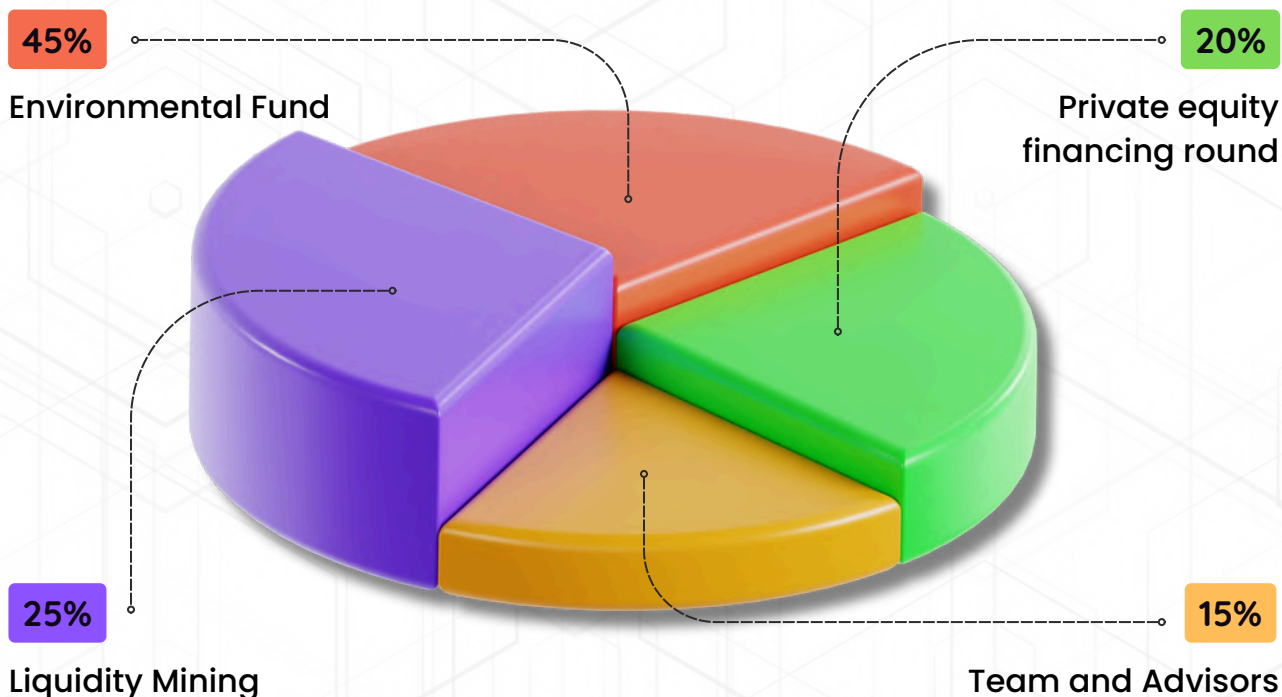
Core Positioning	Equity-backed NFT
Symbol	vVAI
Total	Dynamic binding stake amount
Contract Standards	ERC-721 / Metaplex (Solana)
Fundamental Characteristics	Governance voting rights, protocol dividends, and Metaverse land lease authorizations

Conversion rules: Staking 10,000 VAI can mint 1 vVAI NFT (destroying vVAI can redeem the staked VAI principal)

TOKEN ECONOMIC MODEL

3.2 Token Allocation and Release Mechanism

Allocation Overview:



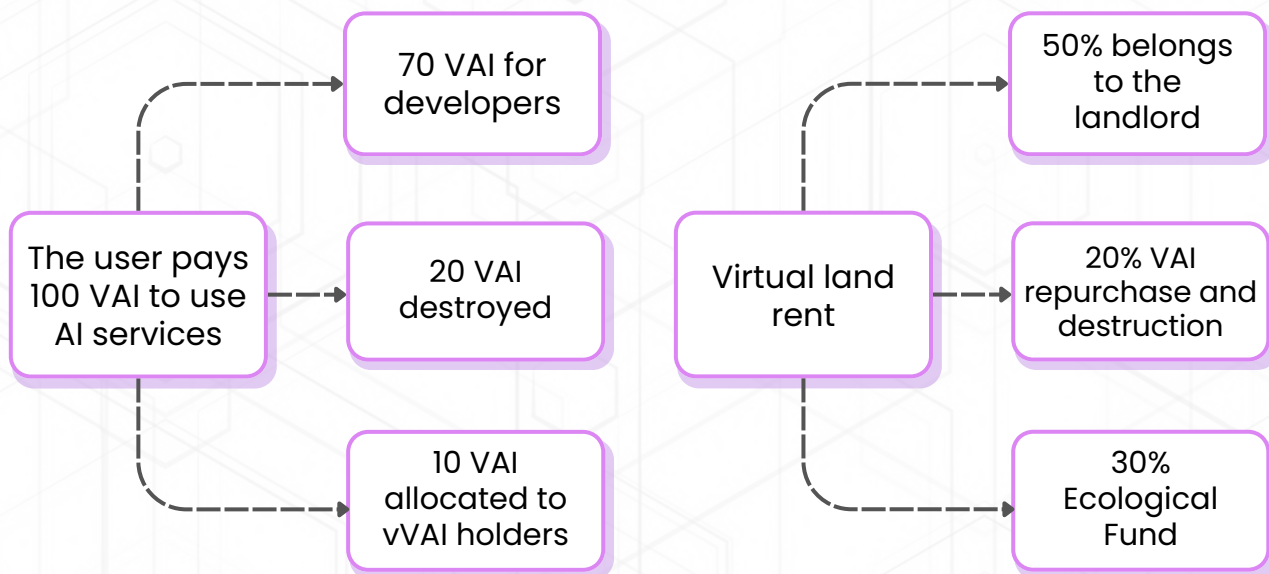
AI Integration Kit:

use	Proportion	Release Guidelines
Environmental Fund	40%	Unlocked progressively over five years, with the community DAO voting to determine allocation (developer incentives/partner development).
Private equity financing round	20%	12-month lock-up period, succeeded by an 18-month monthly release (5.55% per month)
Liquidity Mining	25%	Released more than 36 months following the mainnet launch (5% in the initial month, 2.78% per month thereafter)
Team and Advisors	15%	Completely locked for three years, with a monthly release of 2.08% commencing in the fourth year (total release over 48 months).

TOKEN ECONOMIC MODEL

3.3 Economic Regulation Mechanism

Deflation model



Profit distribution

vVAI holders' rights and interests:

- Daily dividends: 10% of protocol fees distributed based on vVAI.
- Governance privileges: 1 vVAI = 1 vote (voting rights can be delegated to AI proxies).

Liquidity provider incentives:

Trading Pairs	Initial Annual Percentage Yield	Reward Origin
VAI/USDC	185%	0.3% transaction fee
VAI/ETH	152%	Ecological fund grants

TOKEN ECONOMIC MODEL

3.4 Token Value Capture

Demand-side driven

Scenario	VAI consumption framework	Annual consumption projection (initial year of mainnet launch)
AI model invocation	0.1-10 VAI per transaction	105 million (28% of the circulating supply)
Virtual land mortgage	Stake 500 VAI for each plot on a monthly basis.	90 million (24% of the total circulating supply)
Data NFT Creation	5 VAI per item	45 million (12% of the total circulating supply)

Supply-side constraints

Deflationary pressures:

Annual destruction volume = annual transaction volume × 20%

If the annual transaction volume reaches \$250 million (refer to Sandbox 2023 data), 52.5 million tokens (14% of the circulating supply) will be destroyed.

Lock-up effect:

It is estimated that 65% of the circulating VAI will be pledged to mint vVAI (to obtain governance rights and dividends)

TOKEN ECONOMIC MODEL

3.5 Risk-resistant design

Response to extreme market conditions

Protocol Control Value (PCV) Reserve Pool:

20% of the initial injection into the ecosystem fund (80 million VAI) will be converted into 20 million USDC as a stable reserve.

- If the VAI price drops by more than 30% within 24 hours, a USDC buyback will be initiated to support the market.
- If the pledge liquidation rate exceeds 85%, emergency loans will be provided (with a 0% interest rate).

Governance attack defense

- Voting cooldown mechanism: Major proposals require vVAI holders to stake continuously for 21 days before they can vote.
- AI proxy verification: Using open-source models to analyze proposal risks (e.g., detecting malicious parameter modifications).

3.6 Comparison of Competitive Economic Models

project	Token Classification	Value capture inadequacies	VirtAI Advantages
The Sandbox	Single Token	Destruction of unallocated tokens from land revenue.	Double deflation (destruction and repurchase)
Axie Infinity	Dual Tokens	Utility Token SLPs Trapped in a Death Spiral	Fixed total VAI amount along with vVAI equity appreciation.
Decentral and	Single Token	The governance token MANA does not facilitate returns on core assets.	vVAI shared land/AI service revenue

MARKET STRATEGY

4.1 Cold Start Strategy

Developer Attraction Program

Seed Developer Airdrop:

An airdrop of 5,000–50,000 VAI (valued at 250–2500) will be given to core contributors to the top 100 AI projects on GitHub. The conditions are:

- Deploy a working model (such as the Stable Diffusion variant) on VirtAI
- Contribute ≥ 10 pages of documentation

Model migration subsidy:

- Migrate models from competitors (such as Fetch.AI) and receive \$200 in VAI + 0 commissions for 6 months

Hackathon Offensive

Activity	Prize Fund	track
OpenAI co-hosts the AI Creation Competition.	500,000 VAI	Optimal Virtual Human Interaction Design
Epic Games Engine Integration Challenge	200,000 VAI	Demonstration of invoking the VirtAI SDK within Unreal Engine
Southeast Asian Academic Tour	10,000 VAI/school	Affordable AI Metaverse applications (for developing markets)

MARKET STRATEGY

4.2 User Growth Engine

Tiered airdrop mechanism

\$0.05
/user

Sandbox Landholders:

The first 10,000 landowners will receive an airdrop of 50 VAI (worth \$2.5)

\$0.03
/user

Decentraland active users:

Users with ≥10 monthly interactions will receive 20 VAI + a free AI avatar generation coupon

\$1.2
/user

AI Art Platform Creators:

100 VAI airdrop for those with >1K followers on Midjourney/ArtStation

Scenario-based fission activities

AI social fission:

User invites friend to register → Both parties receive 10 VAI + 15% commission on friend's first purchase

Land Colonization Program:

Users pledge ≥500 VAI to claim virtual land → Invite others to join and receive 20% of the rent

MARKET STRATEGY

4.3 Ecological Cooperation Strategy

Metaverse platform access

platform	Mode of collaboration	VAI Integration Scenarios
Roblox	Official Independent Software Vendor Partner	VAI compensation for in-game AI assets
Zepetto	Premium payment platform in Asia	Korean users utilize VAI to purchase virtual fashion.
Dream Realm	The plot comes pre-installed with the VirtAI SDK.	User engagement activates AI tasks to accumulate VAI.

Enterprise-level solutions

Nike virtual store case:

- Deploy AI shopping guides (to answer shoe questions) → Pay 2,000 VAI/month service fee
- Users use VAI to purchase limited-edition virtual shoes → Nike receives 85% of the revenue

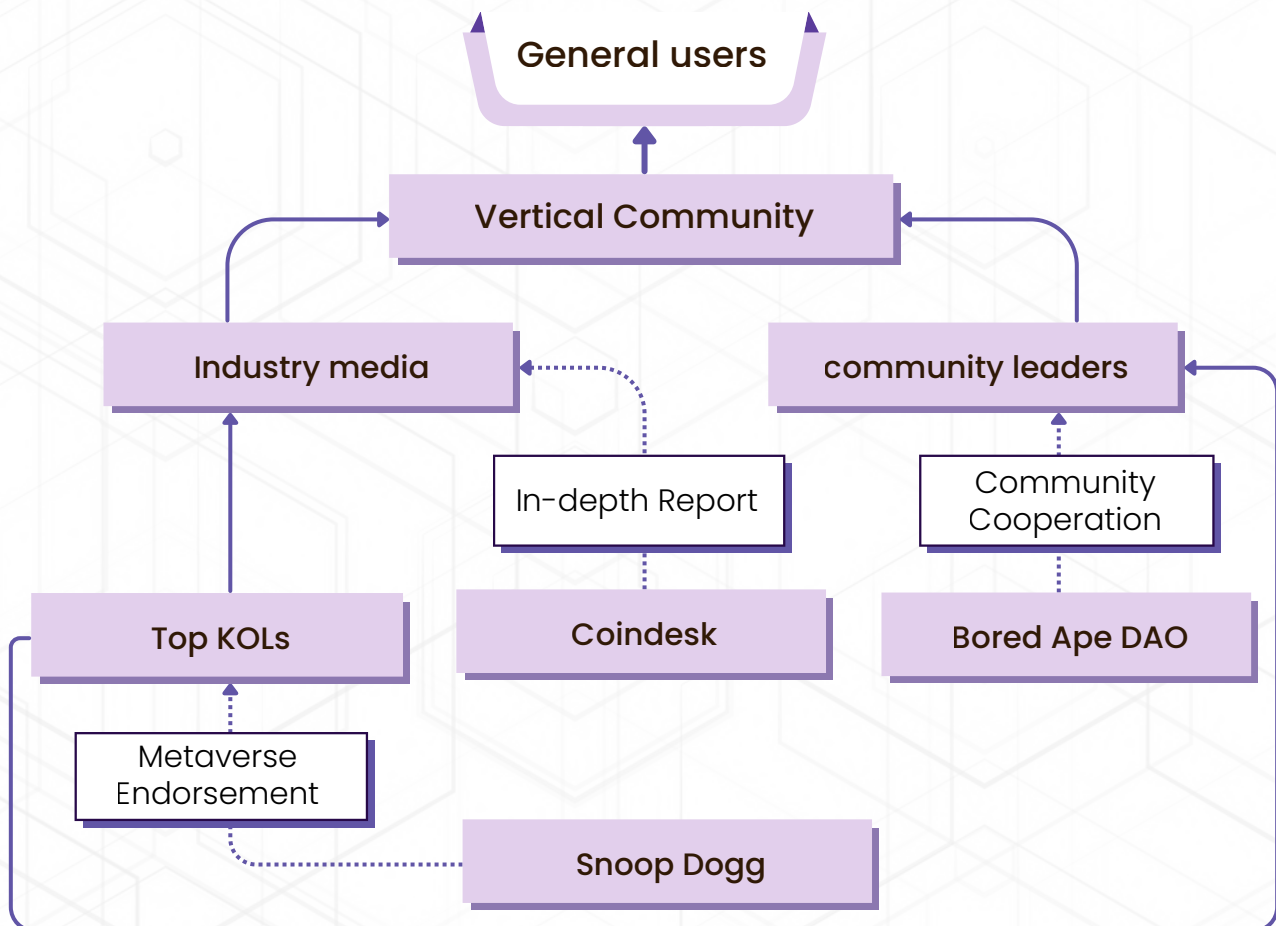
Siemens Industrial Metaverse:

- Equipment fault diagnosis AI model invocation fee: 50 VAI/time
- Annual contract prepaid: \$500,000 VAI equivalent (20% discount)

MARKET STRATEGY

4.4 Global Marketing Matrix

The Pyramid of Influence



Breaking point event planning

Metaverse AI Concert:

- Signed virtual singer Hatsune Miku, users need to stake 100 VAI to obtain ticket NFT → predicted to attract 500,000+ viewers, driving VAI lock-up to \$5 million

Virtual Land Bidding War:

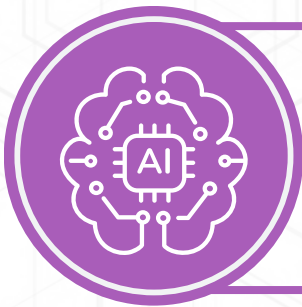
- Auction of a 1:1 Times Square plot in New York City, starting at 1 million VAI (creating FOMO)

CORE APPLICATIONS

VirtAI focuses on three vertical scenarios, transforming AI capabilities into user-operable revenue-generating tools, rejecting abstract concepts and directly targeting commercial implementation.

5.1 AI Model Market

Core Features



AI Developers:

- Upload the model → Automatically generate a digital fingerprint NFT (copyright certificate)
- Set pricing: Pay-per-use (0.1-50 VAI), monthly subscription (exclusive for businesses)



User:

- Pay for VAI model invocation → Instant results (e.g., generating virtual sneaker designs in 10 seconds)
- Resale rights: Generated content can be directly uploaded to platforms like OpenSea

Real Case

- Designer @Luna deployed a virtual fashion generation model on the platform, priced at 5 VAI per call. This resulted in an average of 240 calls per day, generating a monthly passive income of 3,600 VAI (approximately \$1,800).
- Enterprise user Nike rented the AI fitting room model on a monthly basis, paying 15,000 VAI per month (saving \$500,000 in in-house development costs).

CORE APPLICATIONS

5.2 Virtual Land Development Kit

Key Tools



AI Architect

Function Description:

- Enter text to generate 3D store/gallery

Revenue generation scenario examples:

- User @Jake built an AI cafe and earned 800 VAI per month in rental income



NPC Behavior Editor

Function Description:

- Drag and drop to configure the virtual clerk dialogue logic

Revenue generation scenario examples:

- Siemens factory fault diagnosis AI, single service fee is 50 VAI



Inter-Universe Mirror Gate

Function Description:

- Synchronize stores to multiple Metaverse platforms

Revenue generation scenario examples:

- Gucci's virtual store now covers both Sandbox and Decentraland, with traffic increasing threefold

Enterprise applications

Bosch Industrial Metaverse:

Deploy AI for equipment monitoring in a virtual factory → Customers pay diagnostic fees → Bosch takes 45% of the profit + Landowners take 45% of the profit → 500+ calls per day → \$2.7M in annual revenue

CORE APPLICATIONS

5.3 Data NFT Factory

Operation process

- Users use AI to generate content (e.g., a song or 3D sculpture).
- The system automatically adds a copyright watermark and mints a Data NFT.
- NFTs can be traded on multiple platforms, and creators receive a permanent 15% royalty.

Application Scenario

industry	Case	Revenue Model
music	NFT of the virtual singer Hatsune Miku concert	0.5 VAI dividend per play → 21,000 plays weekly
advertise	KFC dynamic billboard approval	Initial sell-off fee: 2000 VAI plus 20% rental share.
Art	3D digital compilation of museum artifacts	Limited to 500 copies, each priced at 80 VAI, sold out within seconds.

LONG-TERM ECOLOGICAL CONSTRUCTION

VirtAI's ecological strategy focuses on three major directions: technological evolution, economic self-circulation, and reality integration, to build a sustainable virtual economy across industries and civilizations.

Ecological core indicators

- ✓ User Scale: 5-year goal: 120 million monthly active users (covering 30% of the global Metaverse user base)
- ✓ Economic Output: Virtual land GDP reaches \$22 billion (surpassing Portugal's 2023 GDP)
- ✓ Reality Interaction: 12% of global university credits are certified on-chain

6.1 Technological Evolution

2025

- Quantum-resistant encryption module
- Brain-computer interface SDK



- Defend against future computing power threats
- Control virtual avatars with your mind

2026

- Light Field Rendering Engine (Reality ↑ 400%)
- AI Autonomous DAO



- Film-quality virtual scenes
- 10x improvement in decision-making efficiency

2027

- Low Earth Orbit Computing Node
- NFT Fragmentation Protocol



- Global millisecond latency
- Land crowdfunding with a starting price of \$1

LONG-TERM ECOLOGICAL CONSTRUCTION

6.2 Economic Self-Circulation

Creator Fission Engine

- Newbie Incentive: First Data NFT sales of 500 VAI → 100 VAI reward
- Mentor Network: Experienced creators receive 20% of their students' revenue → Ecosystem annual growth rate of 65%+

Financialization of Virtual Real Estate

- Paris Champs-Élysées Virtual Land Plot → Split into 1 Million Reit NFTs
- Selling Price: 0.8 VAI Per Plot → Daily Rental Dividend: 0.00015 VAI (7.2% Annualized Yield)

Corporate Revenue Pool

- Siemens/Bosch purchases \$8.6 million worth of VAI industrial AI services annually

6.3 Real-World Anchoring

field	Collaboration Instances	Implementation	Annual advantages
retail	Dubai Mall	Scan the VAI code to access gold membership benefits.	Drive \$5.2 million in expenditures
Environmentally friendly	International carbon credit platform Verra	Factory energy-saving data is integrated into the carbon NFT exchange.	Offset 120,000 metric tons of CO ₂
educate	EPFL	Metaverse course credits are recorded on the blockchain.	8,700 student certifications

LEGAL AND COMPLIANCE

7.1 Entity Compliance Framework

The Swiss foundation (VirtAI Foundation Ltd): holds a VASP license pending approval from FINMA and is responsible for protocol development and ecosystem governance, protected by the Swiss Blockchain Act.

The UAE business entity (VirtAI Technologies AG): has obtained a full Virtual Asset Service Provider license from the ADGM Financial Supervisory Authority, processing global fiat currency deposits and withdrawals and adhering to Islamic financial profit-sharing principles.

The Singapore technology center (VirtAI Labs Pte. Ltd): Qualified under the Payment Services Act for payment tokens, the company focuses on technology research and development in the Asia-Pacific region.

The nature of the token is strictly defined by the Swiss law firm Meller:

- VAI is certified as a pure utility token (citing FINMA Guidelines 3.2.1), intended solely for payment of AI services and virtual asset purchases, with no equity or return promises.
- vVAI is registered as a functional digital collectible (supported by UAE DIFC case law), and users sign an agreement confirming its status as a governance tool, thus avoiding securities designation.

7.2 Data Sovereignty and Privacy Protection

Adopting a dual-compatible architecture for both the EU GDPR and the US CCPA:

- User biometric data (voiceprint/expression) is processed locally using federated learning technology, with zero data transmission back to the EU by default.
- Behavior logs are encrypted and stored on IPFS, supporting zero-knowledge proof queries. Users can trigger complete deletion through the "Right to Be Forgotten" with a single click.
- Copyright for AI-generated content belongs to the creator (in accordance with Article 2.5 of the Berne Convention), and the Data NFT on-chain ownership confirmation system is endorsed by WIPO.

LEGAL AND COMPLIANCE

7.3 Intellectual Property and Open Source Compliance

Core patents build technological barriers:

- The zkML compression algorithm (patent number PCT/EP2024/123) reduces proof costs by 67%, requiring infringers to pay 15% of their global revenue in compensation.
- The cross-chain MEV protection protocol (patent number US202536789A1) automatically freezes the assets of malicious front-runners.

Open Source Strategy:

- The underlying protocol uses the GPL v3 license, forcing derivative projects to be open source.
- The developer SDK uses the Apache 2.0 license, allowing closed-source modifications by enterprises.

7.4 Dynamic Risk Response Mechanism

Gold's Contingency Plan for Regulatory Changes:

- If the US SEC determines that a security is a security: Immediately activate the UAE entity to take over user control, and initiate disaster recovery with the Bahamas CBI license.
- If the EU restricts cross-border data flows: Activate a private relay node in Luxembourg, and take over the Swiss data corridor as an emergency measure.
- If a comprehensive regional ban is imposed: Forcefully migrate on-chain assets to the Singapore hub, and complete liquidation within 72 hours.

The user agreement embeds a mandatory arbitration clause (disputes are submitted to the ICC International Court of Arbitration in Paris), and the treasury reserves 3 million USDC to deal with class action lawsuits.