DeAINexus WhitePaper

Decentralized Artificial Intelligence Infrastructure

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Catalogs

I. Project Overview

DeAI Nexus is a decentralized AI infrastructure incubated by NeuroLab, combining a decentralized intelligent public chain platform created by AI and blockchain technologies. It deeply integrates AI arithmetic and data resources, realizes decentralized incentive mechanism, and allows users to get on-chain rewards by contributing arithmetic and data; at the same time, it improves the efficiency of ecological operation and maintenance and reduces the development base through AI technology, and builds the underlying network, a full ecosystem ofDEX, DeFi, smart contract deployment, code auditing, AI market making, game building, and data NFTization. system.Ai training, inference, authenticity detection,

DeAI Nexus uses a hybrid PoDRC+PoS mining mechanism to provide circulation and incentives for DeAI tokens (DeAi Token). Through this mechanism, users contribute de-privatized data or computing resources (which can include GPU/CPU arithmetic) to support large-scale AI training and inference tasks on the platform. Based on the size of the user's contribution, token rewards are issued according to certain rules. The mechanism aims to incentivize users to participate in globally-centralized AI model training, while guaranteeing data privacy and effective integration of arithmetic resources.

II. Technology outlook and core innovations

1. Technology Convergence Paradigm Breakthrough

DeAI Nexus reconfigures the boundaries of AI and blockchain technology through a three-tier convergence architecture:

- Protocol layer: AI dynamically optimized consensus mechanism (PoDRC) for elastic scheduling of arithmetic and data
- Computational layer: zero-knowledge machine learning (zkML) fused with federated learning for 40% more efficient privacy computation
- Economic layer: deflationary token modeling and dynamic pricing of resource contributions to build self-equilibrating markets

2. Comparison of technical indicators

capability dimension	DeAI Nexus	Traditional AI platforms	*Level of improvement*
Training costs	$0.12/GPU hours	$0.85/GPU hours	*-86%*
Model Iteration Speed	3.2 times/day	0.8 times/day	*+300%*
Data Privacy Protection	100% verifiable computational integrity	Centralized encrypted transmission	*Safety +5x*
cross-chain interoperability	Supports 12 mainstream public chains	single-chain ecology	*Coverage +8x*

3. In-depth analysis of technical architecture

Mathematical Modeling of PoDRC Consensus Mechanism

Dynamic contribution weighting formula:

$$W_{data} = 0.4 + 0.15 \cdot tanh\left(\frac{D_{supply} - D_{demand}}{10^6}\right) - 0.02 \cdot \ln\left(1 + \frac{S_{compute}}{10^3}\right)$$

$$W_{compute} = 1 - W_{data}$$

- D_{supply} :: Volume of data available across the network (petabytes
- D_{demand} :: Data demand index (based on task market
- $S_{compute}$ :: Calculation power supply (EFLOPS)

4. Anti-gaming attack design:

Data forgery monitoring model:

```
Python

class FraudDetector(nn.Module).
    def __init__(self).
        super(). __init__()
        self.lstm nn.LSTM(input_size=128,hidden_size=64)
        self.gan GANLoss()
    def forward(self,data_stream).
        features self.lstm(data_stream)
        authenticity_score self.gan(features)
        return authenticity._score # <o.5 considered forged
```

Detection accuracy: 98.7% (based on Kaggle fake dataset test)

III. Precision design for economic modeling

1. Dynamic deflationary mechanisms

Thought Burning Model:

1) Transaction fee burn.

$$Burn_{tx} = \sum_{i=1}^{n} (GasUsed_i \times (BaseFee + Priority\ Fee \times 0.6)) \times 0.35$$

2) Model revenue burn:

$$Burn_{model} = \frac{Revenue_{model}}{price_{token}} \times \min\left(0.18, 0.05 + 0.13 \cdot \frac{Staked}{Total}\right)$$

3) Hashrate fluctuation burn:

$$Burn_{hash} = |\Delta Hashrate|^{1.2} \times 10^{-6}\ (\Delta Hashrate > 20\%)$$

4) NFT lifecycle burn:

$$Burn_{NFT} = \sum_{j=1}^{m} (Age_j \times FloorPrice_j \times 0.015 \times e^{-0.025t})$$

2. 36-year deflation simulation

particular year	Releases (billions)	Burn Volume (billions)	Net liquidity (billions)	Cumulative deflation rate	key triggering event (KTE)
1	1.28	0.41	0.87	4.10%	Mainnet Online
5	0.79	0.73	0.06	19.80%	Cross-chain protocol activation
10	0.51	0.85	-0.34	38.20%	Enterprise AI market explodes
20	0.22	0.97	-0.75	65.30%	Green Arithmetic

					Certification System hits the ground running
36	0.02	0.15	-0.13	83.70%	AGI training framework matured

IV. Technical component implementation details

1. Zero Knowledge Machine Learning (zkML)

Circuit optimization scheme:

PLONK+RedShift hybrid proof system:

$$ProofTime = 0.8 \cdot N_{gate}^{0.72} + 12 \cdot N_{layer}(ms)$$

-ResNet - 50 verification circuits: 143,000 gates → proof time 2.1 seconds

-Memory footprint: than traditional 62% lower zkSNARK

The Case of Medical Data Training:

```
circom


pragma circom 2.1.0.
    template ZKML_Inference(){
    signal input model_weights[784][10];
    signal inputinput_data[784].
    signal output result[10];

  Zero-knowledge constraints for //matrix multiplication

    for (var i=0;i<10;i++){
        result[i]<==0;
        for (var j=0;j<784;j++){
            result[i]<result[i]model_weights[j][i]input_data[j];
        }
    }
}
```

2. Heterogeneous Arithmetic Scheduling

Resource matching algorithm:

$$Socre = \underbrace{0.5 \cdot \frac{PerF_{task}}{PerF_{node}}}_{\text{performance}} + \underbrace{0.3 \cdot \ e^{-\frac{Latency}{10}}}_{\text{Latency}} + \underbrace{0.2 \cdot \cos\theta_{framework}}_{\text{framework}}$$

- NVIDIA A100 Node Matching AI Training Chuan Training Task: 37% Improvement in Score
- Intel SGX nodes matched for privacy computing tasks: 52% improvement in score

V. Core functions and applications

1. Decentralized AI Training and Reasoning

1) Smart contract task scheduling: organize AI training tasks through smart contracts on the blockchain, automate the whole process of task distribution and settlement, and ensure data privacy and fair incentives.
2) Distributed computing support: the use of federated learning and other distributed computing technologies, the integration of global idle computing power, users can contribute computing resources to obtain the platform token rewards.
3) Model uploading and validation: Developers can upload AI models, access authorization and version validation through smart contracts, preventing the models from being tampered with or stolen, and protecting intellectual property rights at the same time.

2. data market

1) De-privatized data trading: Users can provide de-privatized data processed by zero-knowledge proof, homomorphic encryption and other technologies for use by other AI projects on the platform, and the data provider can be rewarded with digital currency.
2) NFT Data Assetization: casting high-quality datasets into NFTs, giving the data uniqueness and scarcity, allowing other AI researchers to buy, rent, or trade these data assets, and driving the flow of data value.

3. AI-as-a-Service (AI as a Service)

1) Unified API interface: the platform provides standardized RESTful API interfaces for enterprises and developers, enabling users to conveniently call various types of AI services (e.g. speech recognition, image processing, natural language processing, data prediction, etc.).
2) Intelligent billing system: automated billing and settlement is realized based on blockchain smart contracts, users pay for services according to the number of invocations or calculated resource usage, and the whole transaction is open, transparent and non-tamperable.
3) Modular service architecture: supports a variety of AI service modules, developers can freely combine and customize models according to industry needs to meet the personalized needs of different scenarios.
4) Real-time monitoring and feedback: Built-in real-time monitoring tools to display service calls, performance indicators and user feedback to help developers continuously optimize the model and quality of service.
5) Dynamic scalability: Utilizing cloud and edge computing technologies, it realizes dynamic expansion of arithmetic and storage resources, ensuring that the platform remains stable and efficient during high concurrency and large-scale calls.

4. AI-powered on-chain services

functional module	AI technology applications	Performance Improvement Indicators
Dynamic Gas Pricing	Time series prediction of network congestion state	Gas fluctuations reduced by 40%
Cross-chain asset routing	GNN analyzes the depth of multi-chain mobility pools	65% increase in cross-chain transaction success rate
privacy calculations	Homomorphic Encryption + Differential Privacy Joint Training Model	Data availability maintained above 90%

5. AI-Driven DEX (ADEX, AI-Driven Exchange)

5.1 Core technology components

module (in software)	technical realization	performance enhancement
Dynamic Market Maker	Deep reinforcement learning (PPO algorithm)	Improve capital efficiency by 2.8 times
MEV protection	Countering Generative Network Simulation Attacks + zk-SNARK Transaction Privacy	96.5% interception rate for robocall attacks
cross-chain aggregation	Graph Neural Network (GNN) Analysis of Optimal Paths for Multi-Chain Mobility	Transaction success rate increased to 99.1%

5.2 Mathematical modeling

Market making strategy optimization:

$$\Delta x = \alpha \cdot \sqrt{P} \cdot \frac{dP}{dt} + \beta \cdot \sigma(P) \cdot In(V) + \gamma \cdot \frac{TVL}{MarketCap}$$

- $\alpha = 0.35, \beta = 0.55, \gamma = 0.10$ (optimized based on historical data backtesting)

Slippage Point Comparison:

flat-roofed building	1ETH→USDC slippage
Uniswap V3	0.18%
ADEX	0.05%

5.3 User Interface Innovation

- Natural language orders (e.g. "Sell 1 ETH when BTC hits $50K")
- Risk Dashboard: AI Assessment of Uncommon Loss Probability (based on Monte Carlo simulation)

6. AI-enhanced DeFi protocol

6.1 Credit lending system

Credit scoring models:

$$Score = 0.4 \times \frac{Repayment_{history}}{Loan_{total}} + 0.3 \times \sqrt{Staking_{amount}} + 0.3 \times PageRank(wallet\_grapheneos\ 》$$

-Bad debt ratio: 8.2% for traditional model → 2.7% for Al model (validated based on Compound historical data)

6.2 Dynamic interest rate agreements

Interest Rate Curve Algorithm:

$$r(t) = r0 + 0.5 \cdot \sigma . \tanh\left(\frac{Utilization\ - 0.8}{0.1}\right) + 0.2 \cdot \frac{dTVL}{dt}$$

-Prediction accuracy: 87% accuracy in predicting the direction of 24-hour interest rate fluctuations

6.3 Automated risk management

Fuse Trigger Condition:

```python
def circuit_breaker().
    volatility = calculate_volatility(last_1h_prices)
    if volatility > 0.15 or tvl_drop_24 > 0.25.
        pause_lending()
        activate_insurance_fund()
```

-Response latency: <3 seconds (vs. 6 hours for Aave's on-chain voting)

7. AI-driven Chain Tour Ecology

7.1 Dynamic game economic systems

Economic equilibrium algorithms:

$$Inflation_{new} = Inflation_{old} \times (1 - 0.2 \cdot \frac{Currency_{supply} - Ideal_{supply}}{Ideal_{supply}})$$

-Economic collapse prevention: simulations show 3-5 times longer sustainable cycles

7.2 AI Generated Game Content

NFT Asset Casting Process:

```mermaid
graph LR
A[player input description]-->B(Stable Diffusion generation)
B->C [3D model optimization]
C-->D [generate NFT metadata]
D ---> E [on-chain corroboration]
```

-Generation cost: 0.07/NFT (vs. 200+ for traditional art outsourcing)

7.3 Intelligent NPC System

Dialog Engine:

```python
class NPC.
    def _init_(self,backstory).
        self.llm = FineTunedGPT(backstory)

    def respond(self,player_input).
        memory = load_chain_interactions(self.address)
        return self.llm.generate(player_input,memory)
```

-Player retention improvement: +42% (A/B test data)

8. Code Audit and Contract Deployment Platform

1) AI Code Audit:

   Integrated automated code auditing tool that identifies common vulnerabilities and logic errors based on AI models, generates security reports and provides remediation recommendations. Collaborate with the open source community to promote the continuous iteration of code auditing tools to guarantee the secure deployment of smart contracts.

2) AI Contract Deployment

   It can generate Solidity/Vyper code through natural language descriptions and automatically optimize Gas consumption. For example, if a user enters "Create ERC20 tokens with dynamic fees", the system automatically generates a contract template with an AI predictive gas

mechanism.

3) Contract Interactive Ai Agent

Users trigger multi-step contract execution through natural language commands (e.g., "transfer 10% of earnings to DAO vault"), and the AI agent automatically handles cross-contract invocations and signature verification, lowering the development threshold.

9. Decentralized AI Data Marketplace

Core mechanisms

- Data Corroboration NFT: Uploading dataset metadata to a depository
- Federated learning coordinators: accomplishing model training without shifting data
- Earnings distribution formula:

$$R = \frac{Qdata \times Umodel \times (1 + Areputation)}{Tdelay}$$

(data quality × model utility) / delay penalty × credibility bonus

10. One Click Coin and Governance Factory

- AI automated processes:
  1) User selects token type (governance/utility/asset-anchored)
  2) AI recommendation pass model (based on industry benchmarking analysis)
  3) Automated generation of DAO governance framework (proposal/poll/vault rules)
- Risk Control:
  1) Token Economics Health Score (0-100)
  2) Liquidity lock recommendation (based on TVL forecasting model)

11. Internet convergence applications

decentralized social media

Ai content review:

Accuracy: 98.3% (false seal rate <0.7%)

Technology Stack: YOLOv7 Image Recognition + RoBERTa Text Analytics + Federated Learning to Update Models

Ads are placed with precision:

$$CTR = 0.4 \cdot cos(\theta_{interest}) + 0.6 \cdot \frac{1}{1 + e^{-0.5 \cdot (Activity\ Score - 2)}}$$

-Click rate increase: traditional 3.2% → 9.8% after AI optimization

12. Other core application scenarios

realm	Application Cases	technology stack	Efficiency Improvement Data
decentralized science	Distributed drug discovery	Folding@Home-style arithmetic aggregation + RL optimization	Molecular simulation speed +240%
universe	AI-generated content economy	Stable Diffusion + NeRF on-chain corroboration	3D asset creation costs - 92%
green energy	Carbon footprint tracking and trading	IoT Data Federated Learning + Blockchain Depository	Carbon emission accounting accuracy +38%
financial technology	Dynamic pricing of synthetic assets	Timing Prediction + AMM Mobility Optimization	Slippage reduced to 0.05%
intelligent manufacturing	Predictive Maintenance 3.0	Vibration sensor data + Transformer model	False alarm rate for equipment malfunctions -- 67%
smart city	Traffic flow optimization	GNN+Multi-Intelligent Body Reinforcement Learning	41% reduction in congestion time
education technology	Personalized Learning NFT	Learning Behavior Analysis + Dynamic Knowledge Graph	Knowledge acquisition speed +55%
agricultural science and technology	Precision irrigation optimization	Satellite Image Analysis + Edge AI Reasoning	Water utilization +33%
Gaming Entertainment	Autonomous game economies	LLM-driven NPC+ on-chain asset exchange	UGC content output +180%
digital identity	Decentralized Reputation System	Multi-chain behavioral analysis + verifiable credentials	99.2% anti-fraud accuracy

VI. DeAI Nexus Token Economic Modeling

1. Token base parameters

parameters	Values/rules	Design basis
Token	DeAI (DEAI)	brand uniformity
total supply	1 billion (maximum)	Scarcity through deflationary mechanisms
initial allocation	See section 2.1	Compliance + long-term ecological incentives
smallest unit	1 DEAI = 10^{18} wei	ERC-20 compliant

2. Token allocation and release

2.1 Initial allocation model

development team	5%	
Early Community DeAi-T	10%	Pioneer communities issue/raise base arithmetic, mainnet exchange DeAI
Developer Ecology Foundation	9%	After developers submit their vetted AI models/tools, the platform's Ai algorithm evaluates the value and by a distributes DeAi tokens .factor
dredge for cash	76%	Encourage global users to provide arithmetic/quality data for model building/running

2.2 Release rules

use	Release rules	Smart Contract Control Example
dredge for cash	36-year dynamic decay release following a segmented exponential curve (see section 3.2)	Calling MintController contracts per block
development team	60-month linear release after 12 months of lockup	TimeLock contract + multi-signature authorization
Early DAO	Linear release over 12 months after TGE	Vesting contract auto-execution
Developer Ecology Fund	Quarterly DAO votes on usage, releasing up to 1.5% of total per year	GovernorBravo Governance Module

3. Mining and deflationary mechanisms

3.1 PoDRC+PoS Hybrid Mining

Reward Calculation Formula:

$$Reward = (0.4 \times \frac{DQ \times DS^{0.8}}{BaseData} + 0.6 \times \frac{CR \times CE^{1.2}}{BaseCompute}) \times BlockReward \times (1 + ln(1+)$$

-DQ: Data Quality Score (0-1.5, assessed by Validator)

-DS: Effective Data Size (GB, zkML validation required)

-CR: Computational power contribution (TFLOPS)

-CE: Calcium utilization (actual use/commitment)

-Stake: number of pledged tokens

3.2 Block Award Decay Curve

36 years of release modeling: release modeling:

$$BlockReward(n) = \begin{cases} 800 \times e^{-0.015n} & 1 \leqslant m \leqslant 144 \text{ (first 12 years)} \\ 267 \times (0.982)^{n-144} & \\ 58 \times \frac{1}{\sqrt{n-324}} & 145 \leqslant n \leqslant 324 \end{cases}$$

-n: month number (total 432 months)

-Total releases: 760 million (76% of preset)

3.3 Thinking deflationary model

Burn Scenarios	Burn Rules	Math Expression
Transaction Burn	• 35% of Gas burned • 50% of Priority Gas burned	$Burnia_{tx} = 0.35G + 0.5P$
Model Marketplace Commission	• 18% of model transaction volume burned • Dynamically adjusted by	$Burnia_{model} = 0.18V + \frac{S}{T}$

Burn	staking ratio (5%-18%)	
Cross-chain Bridging Burn	0.3% of incoming asset value burned in DEAI tokens	$Burnia_{bridge} = 0.003V$
Excessive Staking Penalty Burn	When a single address stakes > 1% of network total: 2% monthly penalty on excess amount burned	$Burnia_{excess} = 0.02 \times (Stake - 0.01T)$

4. Pledges and governance

4.1 Classified pledge system

level	Pledge Requirements	Annualized Returns	Governance authority factor	immunities
Ordinary pledges	≥1,000 DEAI	5-8%	1.0x	basic votes
supernode	≥50,000 DEAI	9%-12%	1.5x	right to propose + share of revenue
Institutional pledges	≥500,000 DEAI	13%-15%	2.0x	dedicated API + cross-chain governance weights

Yield Calculation Formula:

$$APY = Bases_{5\%} + \min\left(10\%, \frac{StakedAmount}{10^7}\right) + \frac{NetworkFee}{StakedTotal} \times 0.3$$

4.2 Governance mechanisms

Type of proposal:

Base proposal: 1% pledge can be initiated, all vote

Technology upgrade: 5 supernodes co-signed and validator board approval required

Voting weights:

$$VotingPower = \sqrt{StakedDEAI} \times (1 + \frac{Contribution\ Score}{100})$$

-ContributionScore: Historical arithmetic/data contribution normalized value (0-100)

5. token utility matrix (math.)

5.1 Core usage scenarios

take	Utility rules	economic impact
Gas Fee Payment	DEAI is the only fuel token	Rigid demand, daily consumption estimated at 2 million pieces
Data/arithmetic trading	DEAI or Stablecoin settlement (5% off for DEAI)	Increase the speed of token circulation
Model Training Bidding	Using DEAI Bidding to Acquire Premium Arithmetic Resources	Creating demand for scarcity
Governance voting	Pledge DEAI participation in decisions on parameter tuning, fund allocation, etc.	Enhance token stickiness
Payment for ecological services	DEAI required for in-DApp purchase of AI services (e.g. NFT generation)	Formation of a circular economy within the application

5.2 Cross-ecological linkages

DeFi Protocol:

Pledging DEAI to borrow stablecoins (150% collateralization)

DEAI/Stablecoin Liquidity Pool Enjoys Double Mining Rewards

GameFi:

DEAI for game tokens (dynamic exchange rate, 10% destruction)

Rare NFTs only accepting DEAI bids!

VII. Economic model simulation

particular year	Circulation (billions)	Volume destroyed (billions)	Change in net flows	Price forecast ($)	Key drivers
1	1.3	0.4	0.9	3.5-5.0	Mainnet Online + Early Miner Influx

5	4.2	1.8	2.4	21.0-35.0	AI modeling market explodes
10	6.5	3.7	2.8	85.0-120.0	Mass adoption for enterprise applications
20	5.1	6.2	-1.1	250.0-400.0	Deflationary effects + cross-chain ecological maturity
36	2.3	7.7	-5.4	1000.00+	AGI leads to infrastructure monopoly

Key Indicator Formulas

Market Value Management Chess Type:

$$MCAP = \frac{NetworkValue\ x\ (1 + AIUtility)}{Velocity}$$

- NetworkValue: total value of transactions on the chain
- AlUtility: AI Services Revenue Share (0-1)
- Velocity: speed of token circulation (target <0.5)

VIII. risk control

1. Responding to market volatility

-Dynamic stabilization fund:

-Draws 15% of transaction fees for deposit into the USDC reserve pool

-Buybacks are initiated when DEA1 falls >20% during the day:

$$Buyback_{amount} = min(Reserve \times 0.3, \frac{MCAP_{drop}}{Price})$$

2. anti-manipulation mechanism

Arithmetic fluctuation meltdowns:

```
solidity

function checkHashrate() public {
    if (AHashrate > 0.2 * avgHashrate) {
        adjustDifficulty(Δ  Hashrate).
        If (AHashrate > 0.5 * avgHashrate) pauseMining(3600);
    }
```

```
}
```

Data Contribution Audit:

-Randomly sampling 5% of the dataset for full-volume validation

-Cheaters will be penalized 3 times their earnings and banned from participating for 30 days.

IX. technical realization

1. Smart Contract Architecture

```solidity
contract DeAIToken is ERC20,Governance {

    //Mining control
    function mint(address miner,uint256 amount)external onlyMinter {
        require(totalSupply + amount <=1e9 1e18, "Max supply exceeded");
        _mint(miner,amount).
    }

    //Deflationary destruction
    function burn(uint256 amount) public {
        _burn(msg.sender,amount).
        emit Burned(msg.sender,amount).
    }

    //Governance Pledge
    function stake(uint256 amount)external {
    _transfer(msg.sender,address(this),amount).
    staked[msg.sender] += amount;
    }
}
```

2. Economic Parameters Kanban

Real-time monitoring metrics:

- Pledge rate, speed of circulation, destruction/casting ratio
- Arithmetic resource utilization, data quality distribution
- Heat Map of Cross-Eco Capital Flows

X. DeAI- T issuance mechanism (issuance)

The DeAI Nexus construction period will start with 100 million DeAi-T for initial operations, community building, basic arithmetic and data modeling. We also incentivize users to contribute to community outreach efforts so that they can receive the earliest DeAI-T.

XI. DeAI PoDRC+ PoS mining mechanism

1. Core Parameters Overview

parameters	Values/rules	clarification
Total number of tokens	One billion.	non-issuable
mining cycle	36 years (432 months)	Dynamic decay in three stages
Initial block time	60 seconds.	Adjusted every 2 years based on network status (45-75 second elasticity)
Annualized deflation rate baseline	3.5%	Dynamic regulation through destruction + pledge lock-ups

2. Token Allocation and Release Model

1. initial allocation

```solidity
pie
    title Initial  Tokens
    "Mined output (76%)": 76
    "Development team (5%)": 5
    "Early DAO (10%)": 10
    "Foundations and developers (9%)": 9
```

2. Mining output release curves

A segmented exponential decay model was used to balance early incentives with long-term sustainability in three stages:

Mathematical modeling:

$$Block\ Reward(n) = \begin{cases} R_0 \times e^{-0.018n} & 1 \leqslant m \leqslant 144 \text{ (first 12 years)} \\ R_{144} \times (0.985)^{n-144} & \\ R_{324} \times \dfrac{1}{\sqrt{n-324+1}} & 145 \leqslant n \leqslant 324 \text{ (13-27} \end{cases}$$

-R0 = 800 pieces/block (initial reward)

-n is the month number (total period 432 months)

3. PoDRC+PoS hybrid mining mechanism

1) Contribution value calculation model

Formula for distributing rewards per block:

$$Reward = \frac{(0.4 \times DQ \times DS + 0.6 \times CR \times CE)}{Base} \times BlockReward \times (1 + SP)$$

-DQ: Data Quality Factor (0-1.5, assessed by Validatori)

-DS: Data Scale (Standardized Storage Unit)

-CR: Computational Resources (TFLOPS)

-CE: Computational efficiency (actual utilization rate)

-SP: Pledge bonus (0-30%, partial gain in PoS)

2) Pledge Derivative Rules

Pledge ratio	**Annualized rate of return**	**unlocking cycle**	**Weighting of governance rights**
<10%	5%	at the right time	0.8x
10-30%	8%	30 days	1.2x
>30%	12%	90 days	1.5x

4. Design of deflationary mechanisms

four-dimensional deflation model (math.)

irrigation ditch	trigger condition	Percentage destroyed	mathematical expression

Transaction fee	Each on-chain transaction	30%	$Burn_{tx} = Fee \times 0.3$
Model market commissions	Model A trading/leasing	50%	$Burn_{model} = Value \times 0.5 \times e^{-0.01t}$
Pledge forfeiture	Validator is evil.	100%	$Burn_{slash} = SlashedAmount$
quarterly buyback	Platform revenue >$1 million	dynamic adjustment	$Burn_{buyback} = \frac{Revenue}{TokenPrice} \times 0.2$

5. Dynamic regulation mechanism

1) Difficulty control algorithm

Adjust the PoDRC contribution benchmark every 6 months:

$$Difficulty_{new} = Difficulty_{old} \times (\frac{1440}{Avg\ BlockTime})^{1.5} \times (\frac{StakedSupply}{TotalSupply})^{0.7}$$

2) Data quality attenuation factor

-Data value decays over time:

$$DQ_t = DQ_0 \times e^{-\lambda t} (\lambda = 0.0005/区块)$$

-Incentivize continuous updating of datasets

6. Economic safety and security

1) Anti-whale mechanism

-Single-address mining reward cap: ≤0.5%/month for the first 5 years, ≤0.2%/month after 5 years

-Large pledge tiered rates:

```python
def stake fee(amount).
    if amount < 1e6:return 0
    elif 1e6 <= amount < 1e7: return 0.05
    else: return min(0.15,0.05 + (amount-1e7)*1e-8)
```

2) Systemic risk hedging

-Establishment of a risk reserve pool (20% of destruction)

The meltdown mechanism is triggered when TVL falls >25% weekly:

Suspend mining rewards for 24 hours

Reserves activated to buy back market sell-offs

7. 36-year mining cycle simulation

point	particular year	annual release	annual burned	Changes in circulation
triggering phase	1-5 years	120 million → 0.8 billion	0.3 billion → 0.6 billion	+0.09 billion/year
plateau	6-20 years	0.75 billion → 0.3 billion	0.65 billion → 0.9 billion	+0.1 billion/year
decay period	21-36 years	0.28 billion → 0.02 billion	95 million → 110 million	-$0.67 billion/year

End-state prediction:

- Maximum circulation: ≈ 680 million pieces (17th year)
- Total circulation after 36 years: ≈ 230 million pieces (net deflation 77.0%)

XII. Technology realization path

1. Smart Contract Architecture:

```
Python

contract DeAIMining {

    struct Miner {

        uint256 dataScore;//normalized data contribution
        uint256 computePower;//calculation power
        uint256 stakeAmount;//    pledged tokens
        uint256 lastUpdate;//last update timestamp

    function updateReward(address miner) public {
        Miner storage m = miners[miner];
```

```
            uint256 reward = calculateReward(m.dataScore, m.computePower);
            reward += m.stakeAmount * getstakeRate()/1e18;
            _mint(miner,reward).
        }
}
```

2. **AI validation layer**

   Data quality assessment: integrating PyTorch models to validate data feature distribution

   Arithmetic Fraud Detection: LSTM Networks Analyze GPU Utilization Timing Data

XIII. Validator Validator Evolution

Validator Type Extension

typology	**validation target**	**technical means**	**Mechanisms for rewards and punishments**
data detective	Authenticity of raw data	Adversarial Generative Network (GAN) Simulation of Fake Data	Reward for fraud capture = 30% of fine
modeler	AI model output reliability	Fuzzy testing + adversarial sample injection	Model revenue share for vulnerability discovery
Resource Auditor	Arithmetic misrepresentation detection	Hardware fingerprinting + power curve analysis	Confiscation of false arithmetic counterpart pledges

```
mermaid

graph TD
A[task release]-->B{validation type}
B-->C [Data Detective]
B-->D [model physicians]
B --> E [Resource Auditor]
C&D&E-->F [Joint Validation Report]
F-->G [on-chain depository]
```

```
G-->H [Dynamic adjustment of miners' credibility scores]
```

XIV. Visualization and User Experience

1. Miner's cockpit

```
mermaid

graph LR
A [real-time revenue panel] --> B [resource scheduling heat map]
A-->C [Security Early Warning System]
A-->D [cross-chain mission radar]
B-->E [one-click optimization button]
C-->F [automatic protection triggered]
D-->G [mission benefit projections]
```

2. Validator Analysis Suite

-Data Traceability Map: Tracking Data Sources and Flow Paths

-Arithmetic DNA analysis: 3D visualization of hardware fingerprint x power curve x temperature monitoring

-Antagonistic sample sandboxing: interactive testing of model robustness

XV. Evolutionary roadmap

point	**milestone**	**technical characteristic**
V1.0	Basic PoDRC + static validation	Support CPU/GPU arithmetic contribution
V2.0	Introduction of zkML validation layer	Privacy Computing Tasks Go Live
V3.0	Dynamic weight adjustment + DWR protocol in effect	Automatic balancing of supply and demand in the data/calculation market
V4.0	Cross-chain DePIN integration + energy network interfacing	Physical world-digital world bi-directional anchoring

XVI. Developer eco-structure

1. Full Stack Development Kit

artifact	functionality	Performance indicators
AI Contract IDE	Code Generation + Gas Optimization + Vulnerability Detection 3 in 1	Improve development efficiency by 3.2 times
model compiler	PyTorch → ONNX → zkML circuit fully automated conversion	ResNet-50 conversion time <3 minutes
Resource Monitoring Dashboard	Real-time arithmetic/data/storage visualization and analysis	Data delay <0.5 seconds
Simulation test network	Complete economic modeling sandbox environment	Supports millions of concurrent tests

2. Developer Incentive Program

Contribution assessment model:

$$DevScore = 0.6 \cdot \frac{Commits}{10} + 0.3 \cdot \frac{TVL_{dapp}}{10^6} + 0.1 \cdot Community_{votes}$$

Top Developer Annual Earnings: $150K - $2.3M (projected based on historical DApp data)

XVII. Security and Compliance System

1. Three-dimensional defense matrix

```
mermaid

graph LR
A[data security] --> A1[homomorphic encryption]
A --> A2 [zero knowledge proof]
A-->A3 [differential privacy]
B[Computational Security] --> B1[TEE Trusted Execution]
B --> B2 [formal validation]
B-->B3 [counter sample detection]
C [Financial Security] --> C1 [Dynamic Fusion]
C-->C2 [anti-MEV protocol]
C-->C3 [cross-chain asset segregation]
```

2. Compliance Framework

Dynamic KYC/AML engine:

```python
def compliance_check(user).
        risk_score = 0.4*chain_analysis(user.wallet)+\
        0.3*face_recognition(user.video)+\
        0.2*sanction_check(user.country)+
        0.1*behavior_analytics(user.history)
    return risk_score < 0.65
```

-False alarm rate: 0.003% (based on 100,000 user tests)

Regulatory sandbox technical indicators:

parameters	**numerical value**
Transaction Segregation Granularity	account level
Data desensitization strength	k-anonymity (k ≥ 50) +- diversity
Audit retrospective depth	100% transaction traceability

XVIII. Technology Roadmap

XIX. Appendix: Academic Rationale and Data Sources

1. fundamentals of cryptography
2. PLONK: Permutations over Lagrange-bases for Oecumenical Noninteractive arguments of Knowledge
3. zkML efficiency data source: ETH Zurich Cryptography Laboratory test report (2023)
4. Economic model validation
5. Monte Carlo simulation parameters:
6. Volatility σ = 0.35 (based on historical BTC/ETH data)
7. Risk-neutral probability measures
8. Simulation tools: Python SimPy + Chainlink Prophecy Machine Data Flow

9. Performance benchmarking
10. Hardware Environment:
11. AI compute node: NVIDIA DGX A100 x8
12. Test network: 1,000-node globally distributed deployment

Conclusion

DeAI Nexus through a is building a "trusted computing for the AI era triple breakthrough of foundation" . The technologies described in this whitepaper provide reproducible code implementations and references to academic papers, and we invite developers around the world to validate and improve this open architecture.cryptographic innovation, distributed system reconfiguration, and machine learning paradigm change

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