

HYNEX

OFFICIAL WHITEPAPER 2025

Blockchain-Based Semiconductor Supply Chain Verification Infrastructure

BLOCKCHAIN-BASED HYNEX SUPPLY CHAIN VERIFICATION INFRASTRUCTURE

TRUST THE SILICON SUPPLY CHAIN

02

INTRODUCTION

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MISSION

To eliminate the global semiconductor supply chain trust gap and ensure full transparency across the ecosystem.



CORE TECHNOLOGY

End-to-end lifecycle data — from fabrication to verification, packaging, logistics, and OEM — is cryptographically secured and recorded on blockchain.



VALUE PROPOSITION

Real-time supply chain visibility, Automated regulatory compliance, Reduced operational costs, Minimized risk exposure



END RESULT

Establishment of a national-security-grade trusted semiconductor supply chain infrastructure.

Trust the Silicon Supply Chain

HYNEX integrates fragmented semiconductor ecosystems into a single trusted network. Beyond tracking, it mathematically proves data integrity.

100%

Traceability & Data Integrity



Fab



OSAT



Logistics



OEM



BLOCKCHAIN LEDGER

Immutable audit-ready distributed ledger of all lifecycle events.



SMART CONTRACT

Automated quality approval, compliance enforcement, and settlement processes.



NFT PART IDENTITY

Unique NFT-based digital identity for chips, modules, and components.



AI SUPPLY CHAIN INTELLIGENCE

Risk scoring, anomaly detection, yield prediction, and delay forecasting.

TECHNOLOGYSYNERGY

YNEX's four core technologies are organically Combined, data reliability and operational Maximize efficiency at the same time It creates synergy.

4-Layer

INTEGRATED
ARCHITECTURE

 Secure

 Automated

 Unique

 Predictive



Multi-layered complexity (Foundry) – OSAT – Part Supply – EMS – OEM – Complex, fragmented multi-stage production processes leading to logistics.



Data Silo and Disconnect (Data Silos) Each step-by-step system is disconnected, and information flow is blocked and mutual verification is impossible due to data format mismatch.

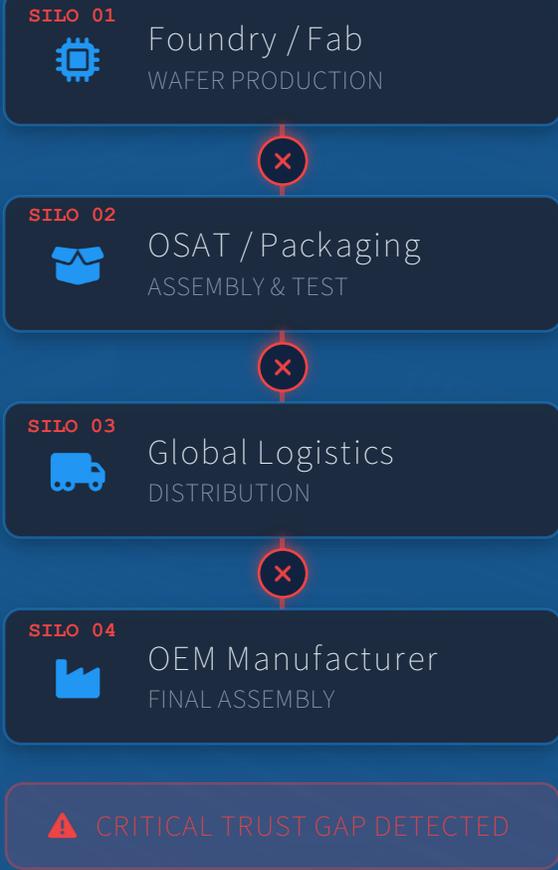


Realistic limitations of handwriting verification rely mostly on handwriting records (PDF, Excel) and sampling checks, making it difficult to ascertain whether the source data is manipulated and lacking reliability.



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LEGACY SUPPLY CHAIN



Why is supply chain trust a problem now?

Three key risk factors created by the limitations of physical validation and data inconsistencies



Risk of Forgery

Replace labels during physical movement of parts (Label Swapping) or transcript forgery occurs, it is difficult to detect.

- Document/label manipulation (Tampering)
- Intervention in the Intermediate Distribution Stage
- Repackaging Disposal Chip Distribution



Uncertain Authenticity

Whether the parts installed in the final product are originally designed, there is no way to verify that the test log is the source.

- Test report integrity not verifiable
- Origin tracking disconnected
- Black boxed distribution history



Escalating Costs

Backtracking to identify the cause of the problem I'm very grateful for the back-tracking and audit. It takes time and money.

- Manual Audit Staffing
- Large Recall Risk
- Legal dispute settlement costs

THE CHALLENGE

Need an automated infrastructure that ensures data integrity and enables mutual verification





Lack of Visibility

If production delays or logistics bottlenecks occur, it is difficult to check in real time, and supply risks are not detected early, resulting in loss of response golden time.



Regulatory Burden

The manual mapping and certification of different regulatory requirements for each country, including ESG, export control, and security certification, incurs excessive administrative costs.



Inefficient Operational Processes

Fragmented vendor portals and email/excel-based handwriting processes can lead to human error and impede work efficiency.



Need for automation and standardization

It is urgent to introduce an automated audit system based on standardized data models to reduce compliance costs and ensure data reliability.

<Supply Chain Monitor>

 ALERT

Real-time Visibility

DISCONNECTED

Compliance Check

MANUAL_REQ

Risk Intelligence

NO_DATA



HIGH_OP_COST

Manual verification delayed > 48h

Integrated Trust Verification Semiconductor Platform Structure

HYNEX is designed with a four-layer, stacked semiconductor structure that combines smart contract automation, NFT ID traceability, and AI intelligence on top of blockchain immutability.



Unalterable trust(Trust)



Automate compliance(Automation)



Real-time Visibility(Visibility)



Risk prediction and response (Intelligence)

L4

AI Risk Intelligence

Automate quality verification and map regulations

Risk Scoring

Anomaly pattern detection

Delay prediction

L3

NFT Part Identity

Integrate chip/module specific ID and history

Unique Part ID

Lifecycle Management

Interoperability

L2

Smart Contract & Compliance

Automate quality verification and map regulations

Automatic settlement

Quality approval

Compliance with export controls

L1

Blockchain Trust Layer

Ensure distributed ledger and data integrity

Impossible to falsify

ZKP

Audit Tracking

01



Immutable Ledger

An immutable ledger that records all events in the supply chain, it is the foundation of trust in the HYNEX ecosystem.



Range of records(Scope)

All process data from raw materials to final product receipt Writes permanently to the blockchain.



Manufacturing



Verification



Packaging



Distribution



Core characteristics(Characteristics)

- ✔ Impossible to falsify:
Once recorded, data can be modified or deleted
Impossible to prevent manipulation
- ✔ Audit-Ready:
Keep auditable anytime without any preparation
- ✔ Timestamp: Record the exact point of occurrence of all events



Protect sensitive data(ZKP)

A company's sensitive manufacturing recipes or trade secrets are It is protected by Zero-Knowledge Proof.



It does not disclose the data, but it does not define the regulations Mathematically prove only compliance



Final value(Value)

Proof of origin(Provable Lineage)

100% confidence in the origin and path of the part

Responsibility traceability(Traceability)

Accurate accountability in the event of a problem

02



Smart Contract

Quality verification, approval, and settlement processes

Automate and regulate country-specific regulations

Forced at the system level

It is an intelligent logic layer.



Logic Automation

If conditions are met without manual intervention, the contract is executed immediately.



Regulatory Circuit

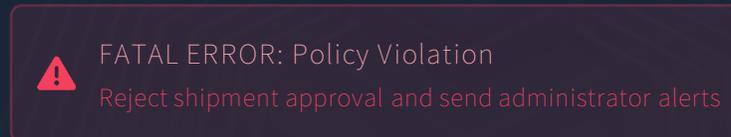
It automatically applies complex country-specific regulations by coding them.

- ✓ ESG Standards: 탄소 배출량 및 윤리적 조달
- ✓ Export control: 전략 물자 반출 제한 확인
- ✓ Security Verification: 필수 보안 인증서 보유 체크



Violation Interrupt

Force interruption of the process upon detection of a violation of the regulation.



Efficiency Gain

-  **Time Reduction**
90% reduction in processing time(Latency Minimized)
-  **Cost Saving**
Minimize compliance/audit costs

03



Digital Part Identity

It's unique to each physical component Integrated management of the entire life cycle by granting digital identity (NFT).



Issuing a unique ID (Issuance) (Issuance)

Unique NFT IDs that cannot be forged or altered on a per-chip, module, or part basis. Issue to create a digital twin.



H/W



NFT ID 제공



Interoperability (Interoperability)

It also serves as a trusted common reference key between participants using different systems.

OEM



OSAT



Audit



Lifecycle History Integration (Lifecycle)

Beyond simple production records, it integrates distribution and follow-up records.

- A revalidation record: Quality reconfirmation data in the distribution process
- Lifetime Management: Tracking usage time and environmental exposure history
- RMA/Refurbished: Return, repair and resale history revealed



Final value (Value)



Part Forgery Prevention

Fake/Remarking Cut off the source of the chip



A/S Efficiency

Quick cause analysis with historical inquiry

04



AI Risk Intelligence

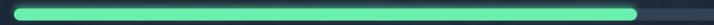
An intelligent layer that proactively manages supply chain risks by performing risk scoring, anomaly detection, and predictive analysis.



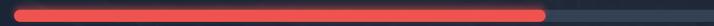
Risk Scoring (Risk Scoring)

Scores reliability and risk by supplier, part, and logistics path in real time.

Supplier Reliability 88/100



Geopolitical Risk High



Anomaly Detection

Real-time detection of quality data and transaction behavior outside of the usual pattern.

Abnormal yield decline

Off course

A pattern of suspected counterfeiting



Predictive Analytics

- ✓ production plan optimization:
Efficiency of processes by forecasting demand and material supply
- ✓ Delay prediction:
Proactively identify logistics bottlenecks and issue Early Warning



Large Log Analysis

Analyze millions of manufacturing and testing logs to determine the root causes of quality problems.

*Data-driven cause analysis
minimizes recall costs and maximizes yield*



HYNEX Token

\$HYNEX

It is the key currency and utility token of the HYNEX ecosystem.

It serves as a key medium for connecting the activities of all participants and exchanging values.

Utility

Governance



Verification/Authentication Payment

Pay fees incurred when companies use semiconductor verification and certification services.



Smart Contract Fuel (Gas Fee)

It bears the gas costs required to implement smart contracts, such as regulatory automation and quality approval.



Issue NFT ID (Issuance)

Incineration or payment when creating unique NFT credentials for chip, module, and part units.



Governance Participation

Establish standardization strategies and exercise voting rights for protocol upgrade proposals (SIPs).



Network Incentives (Incentive)

It is rewarded to network node operators and participants who provide high-quality verification data.

Token allocation structure (Allocation) – 800M

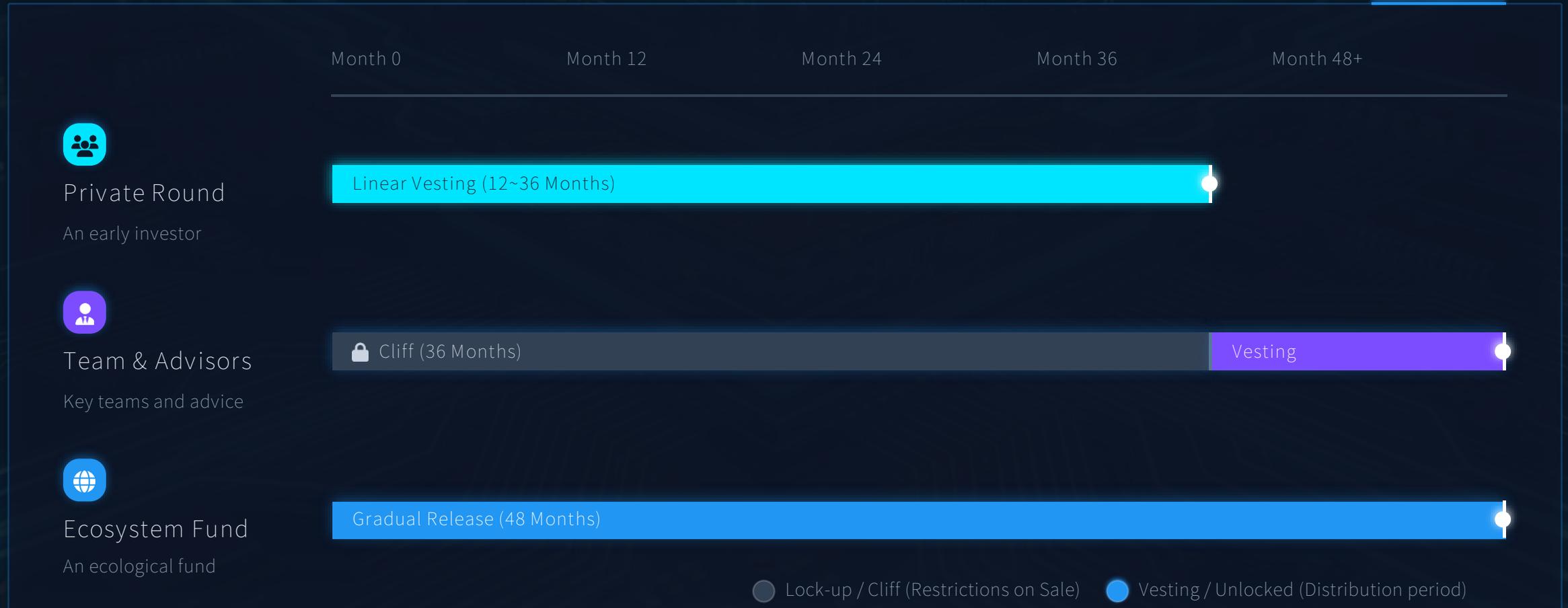


- Ecosystem Fund 200M
- Private Investors 160M
- Strategic Partners 120M
- Team & Advisors 120M
- Operations / R&D 80M
- Liquidity 80M
- Reserve 40M

Total Supply: 1,000,000,000 HYNEX Initial Strategic Burn: 200,000,000 HYNEX (20%)
 Circulating Supply Post-Burn: 800,000,000 HYNEX Additional Deflation Model:
 Transaction-based burn + Quarterly Buyback & Burn

Lockup Design for Long-Term Value Preservation

It applies a systematic lock-up and vesting schedule of up to 48 months to prevent rapid distribution growth of tokens and contribute to the long-term success of the project by teams and early investors.



→ An influx of funds(Inflow)

Semiconductor manufacturers and OEMs pay \$HYNEX tokens to use verification services, issue NFT IDs, and execute smart contracts.

↔ Compensation distribution (Outflow)

Network verification nodes, test labs, and data providers are rewarded with token incentives and some fees based on their contribution.

↻ Value Loop

As trust data accumulates, network value rises, preserving token sparsity and value through incineration mechanisms.



\$HYNEX



Stake/Burn



Token Holders & Stakers

VALUE

Incentives



Validators & Labs

REWARDS



PHASE 01

Foundation Governance



Defining Network Rules: Initial Protocol Design and Establishment of Basic Operational Principles



Standardization Strategy: Establishment of semiconductor data standard models and API specifications



PHASE 02

Enterprise Governance



Consortium operation: Key participants such as manufacturers, OSATs, OEMs, and verification agencies



Business Decision Making: Key Partnership Approvals and Policy Coordination



PHASE 03

Token-based Governance

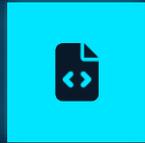


SIP Proposals and Voting: Protocol Improvement Proposals (SIPs) and On-chain Voting



Policy Reflections: Smart Contract Updates Based on Community Agreement

HYNEX aims for progressive decentralization, starting from the foundation-led initial stabilization phase, going through the expansion of enterprise consortiums, and finally to decentralized governance involving token holders.



PHASE 01

Proposal & Review

 Registration of Proposals (SIP): Submitting Proposals for Improvement and Initiating Public Debates in the Community

 Preliminary Review: Feasibility and Security Review by Foundation and Technical Committee

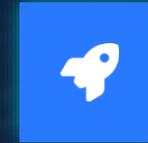


PHASE 02

Voting & Approval

 On-chain Voting: Governance Token Holder Voting (Check quorum and majority)

 Approval of Action Plan: Final Action Plan and Schedule Upon Vote Pass



PHASE 03

Execution & Monitor

 Policy Reflection: Smart Contract Update and Automatically Apply Network Rules

 Monitoring: Analysis of Change Application Results and Continuous Performance Review

 All SIP processes are recorded transparently on the blockchain, and the community's consensus determines the evolution of the network.



Hybrid Model

WEB2 SAAS + WEB3 FEES
 HYNEX combines subscription enterprise services with transaction-based fees to achieve a stable and scalable diversified revenue structure.

Recurring

Transactional

Scalable



VERIFICATION FEE

Basic fees incurred when the verification authority performs quality verification for semiconductors and components



ENTERPRISE SAAS

Global Supply Chain Live Monitoring Dashboard and ERP Linked API Monthly Subscription Fees



CONTRACT EXEC. FEE

HYNEX Coin Gas Cost for Automated Quality Approval, Settlement, and Regulatory Compliance Process Execution



NFT CREDENTIAL

Cost of issuing unique digital IDs and generating lifecycle history for chips, modules



AI RISK SCORING

Supply Chain Risk Forecast, Anomaly Detection Premium Analysis Services



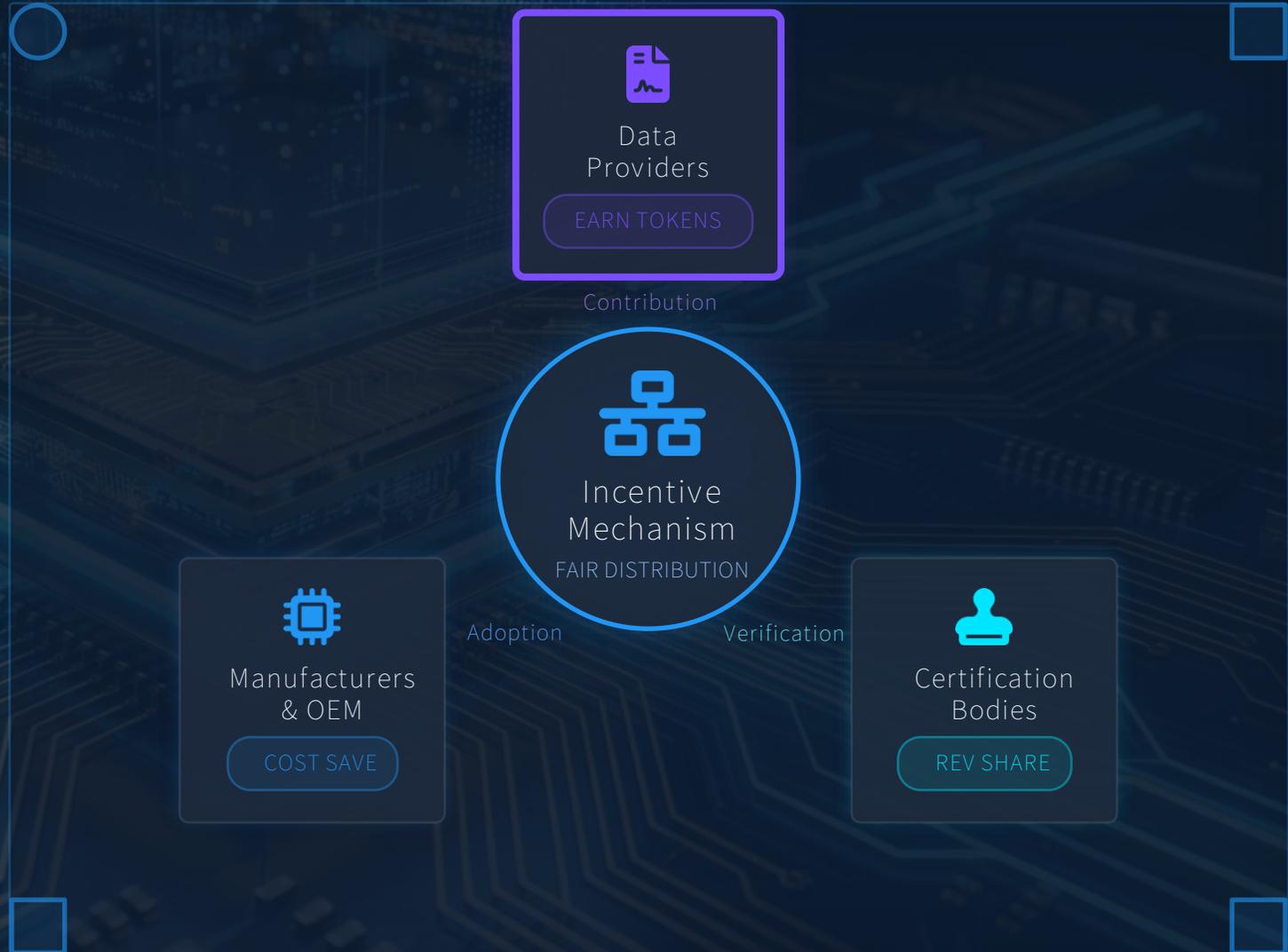
ADVANCED DATA

Anonymized industry dataset access and deep market report delivery services

Data Provider
 Contributing verifiable data to the network, such as manufacturing logs and quality test results, will earn \$HYNEX token rewards.

Certification Body
 It performs third-party verification and certification services, and automatically distributes commission income through smart contracts.

Manufacturer and OEM (Enterprise)
 Increase operational efficiency by reducing risk due to prevention of forgery, reducing dispute resolution costs, and ensuring supply chain transparency.



2026

INFRASTRUCTURE & VALIDATION



Building Infrastructure Layers

Layer 1 (blockchain) and Layer 2 (smart contract) Mainnet launch and basic node environment configuration completed



Initial Partner PoC PILOT

Conducting chip traceability and data consistency verification pilot with 3 core foundry and OSAT companies



Core Standard Definition STD

HYNEX Improvement Proposal (SIP) Standard Framework 1.0 for Semiconductor Data Exchange



2027

EXPANSION & INTELLIGENCE



AI to commercialize AI risk detection engine

Layer 4-based supply chain risk scoring model beta opening and abnormality detection services launched



Expand cooperation with global certification bodies

Partnerships with ISO/IEC certification bodies and security assessment bodies (Security Labs) and link automatic certification processes



Enterprise Integration(ERP/MES)

Formal deployment of two-way data interworking APIs between legacy systems (SAP, Oracle, etc.) and HYNEX from major enterprises



2028

STANDARDIZATION & ECOSYSTEM



International Standardization Consortium Participation STD

Leading the establishment of blockchain-based semiconductor history management standards in cooperation with global organizations such as HYNEX and JEDEC



EXPANSION OF OEM AND EQUIPMENT COMPANY

Expanding forward industrial ecosystems by expanding automotive and aerospace OEM partnerships



Enhanced interoperability

Cross-chain interoperability technology advancement with other blockchain networks and legacy SCM systems



2029

GLOBAL NETWORK COMPLETION



Global Verification Network Completed Globally

Establishment of a single trust verification network connecting major semiconductor bases worldwide (US, Taiwan, South Korea, and Europe)



Manufacturing Automation Interworking (M2C) AUTO

Machine-to-Chain technology enables manufacturing equipment to log verification data directly to the blockchain



A fully autonomous ecosystem

Token-based governance (DAO) is fully operational and enters a mature phase with 99.9% or more data reliability guaranteed



 RISK FACTOR

 MITIGATION STRATEGY


Delay in market adoption

Resistance to the introduction of new technologies

Step-by-Step

Proof of concept → Pilot → Scale step-by-step onboarding and initial incentives



Absence of international standards

Data Format Compatibility

Consortium

Lead industry consortiums with key manufacturers and organizations to standardize data models and link ISO



Data Privacy

Concerns over leakage of trade secrets

Zero-Knowledge

By applying ZKP (Zero-Knowledge Proof) technology, the original data is stored off-chain encrypted and only the verification results are recorded on-chain



Regulatory changes and uncertainties

Export Control and Regulation

Compliance

From the design stage, reflect Compliance-by-Design and activate automated regulatory mapping systems



Cost burden of operation

Blockchain Cost Issues

Tokenomics

Efficient Layer 2 solution optimizes fees and offsets operating costs with network contribution rewards (Reward)

✓ Token Classification

The \$HYNEX token is designed as a utility token for the use of services on the platform and is not a security token and therefore does not guarantee profit distribution or equity.

✓ Compliance with global regulatory frameworks

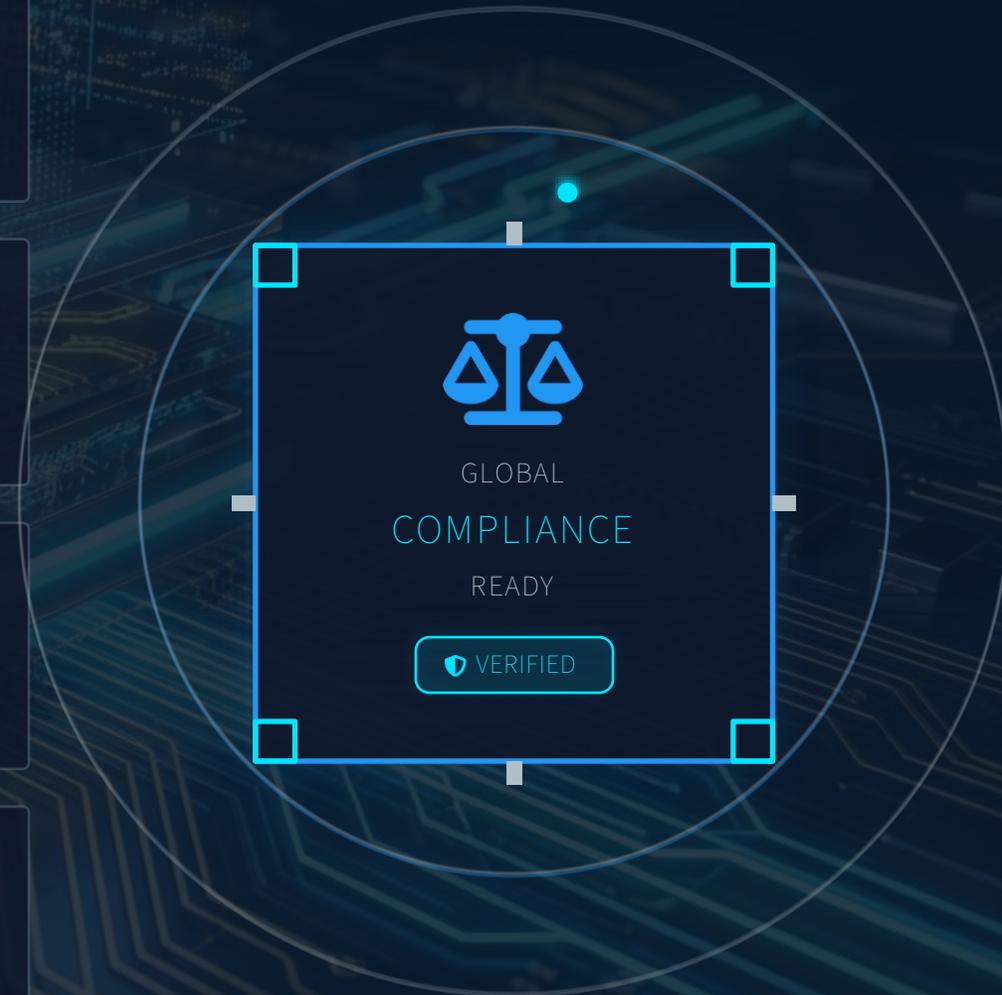
It complies with the FATF Travel Rule and the EU's Markets in Crypto-Asset (MiCA) regulations, and minimizes legal risks by considering US SEC guidelines.

✓ Apply KYC/AML Policy

Ensure strict identity authentication (KYC/KYB) and anti-money laundering (AML) monitoring for all enterprise participants and node operators.

✓ Data Protection and Export Control

It complies with personal information protection laws such as GDPR/CPRA and reflects international export control regulations related to semiconductor technology at the system level to prevent violations.



HYNEX

TRUST THE SILICON SUPPLY CHAIN

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