ThingX

Decentralized IoT Protocol 2025

white paper

Version: 1.0

Website:
thingxproject.site

ThingX

Preface

In the digital economy, IoT devices are growing at an unprecedented rate, but the existing centralized architecture severely constrains their potential. Data flow between devices is monopolized by platforms, value exchange relies on the traditional financial system, and high trust costs hinder the scalable development of the machine economy. ThingX was born to address this challenge, committed to building an open and efficient IoT value network through blockchain technology, enabling billions of devices to truly interact and create value autonomously.

Core Innovation

We combine a high-performance mainchain with a lightweight quantum blockchain to support massive device connectivity while ensuring security. We also enable instant micropayments between devices through our native $ThingX token. This design not only addresses the scalability bottlenecks of traditional IoT but also provides the infrastructure for data assetization and machine-automated transactions, driving the paradigm shift from "connectivity" to "value interconnection" in the IoT.

Join us

ThingX adopts an open governance model, using token incentives to attract developers, hardware manufacturers, and users to participate in ecosystem building. From smart cities to the Industrial Internet of Things, ThingX is working with global partners to build a future network where devices are autonomous and value flows freely. This is not just a technological innovation, but a transformation of production relations. We look forward to your joining us as we write a new chapter in the machine economy.

Table of contents

ThingX

1. PROJECT VISION AND MISSION

1.1 Project Vision

In the era of the Internet of Everything, the number of IoT devices is growing exponentially, and it is estimated that by 2025, the number of active IoT devices worldwide will exceed 75 billion. However, the current IoT ecosystem faces three fundamental challenges:

01

Value circulation barriers:

The massive amount of data generated by devices is trapped in centralized platforms and cannot be freely traded.

02

Lack of trust in interactions:

Machines lack autonomous settlement capabilities and rely on manual intervention and traditional financial systems.

03

Inefficient use of resources:

More than 60% of device computing power and storage resources are idle

ThingX's vision is to build the first truly autonomous machine economy network, enabled by blockchain technology:

- Make each device an independent value node in the digital economy.
- Establish a peer-to-peer value exchange protocol between devices.
- Unleash the commercial potential of idle resources in the IoT ecosystem.

1. PROJECT VISION AND MISSION

1.2 Project Mission

Mission 1

Reconstructing the way value flows in the Internet of Things:

- Develop a decentralized data transaction protocol to capitalize device data.
- Establish an automated settlement system based on smart contracts.
- Return data ownership to device owners.

Mission 2

Reduce the trust cost of machine collaboration:

- Establishing a device credit system through blockchain's immutable nature
- Using zero-knowledge proof technology to protect business privacy
- Developing a lightweight consensus algorithm suitable for resource-constrained devices

Mission 2

Optimize global resource utilization efficiency:

- Build a device resource sharing market (computing power/storage/bandwidth)
- Design an incentive mechanism based on a token economy
- Develop a resource scheduling optimization algorithm

***Goal**: Increase the comprehensive utilization rate of IoT devices to 85% by 2025*

2. TECHNICAL ARCHITECTURE

2.1 System Overview

ThingX adopts a layered hybrid architecture to optimize the access efficiency of IoT devices while ensuring decentralization. It mainly consists of the following layers:

Device layer

The physical device access layer supports hardware such as sensors and gateways.

Edge Layer

Local data processing and caching reduce cloud dependency.

Blockchain layer

The core transaction settlement and data storage layer ensures that it cannot be tampered with.

Application Layer

Smart contracts and DApp interfaces provide business logic support.

Each layer interacts through a standard API to ensure modular design and facilitate ecological expansion.

2. TECHNICAL ARCHITECTURE

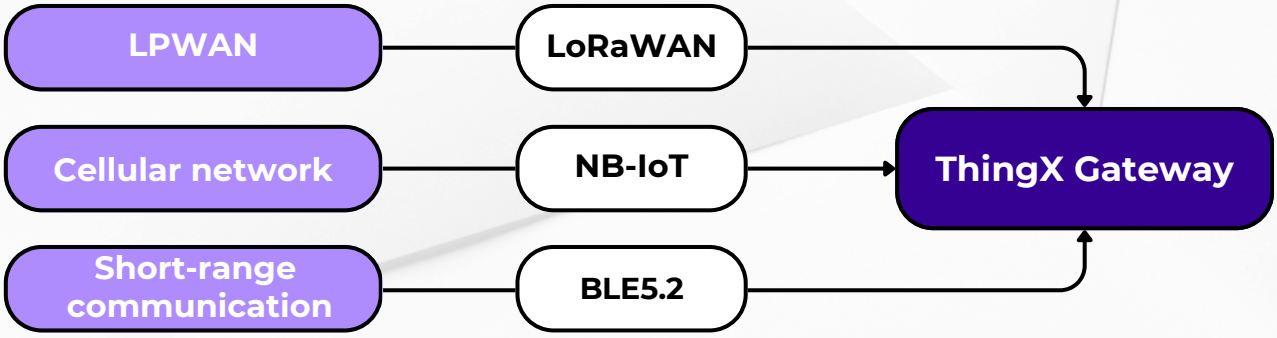
2.2 Architecture Detail

Device layer (physical world interface)

Device authentication module:

- Builds device digital identity based on the IEEE P2145 standard
- Supports three authentication modes:
  - Hardware-level: TEE Trusted Execution Environment (such as Intel SGX)
  - Firmware-level: HSM secure chip signature
  - Software-level: Lightweight ECC encryption

Communication Adapter:



Edge layer (local processing)

Edge computing nodes:

Deployment requirements	Core Features
• Latency: <50ms response time • Hashrate: At least 4-core ARM Cortex-A72	• Data pre-processing (filtering/aggregation) • Temporary transaction cache • Local consensus verification

Distributed storage network:

- Using IPFS + Erasure Coding technology:
- Data persistence: 99.9999%
- Retrieval latency: <200ms (same region)

2. TECHNICAL ARCHITECTURE

2.2 Architecture Detail

Blockchain layer (value settlement core)

Double chain structure design:

characteristic	Main Chain (ThingX Blockchain)	Subchain (MeshNet)
Consensus Mechanism	PoS and PBFT hybrid	Enhanced iteration of DAG+Tangle
Block duration	5 seconds	Asynchronous confirmation (average duration of 0.8 seconds)
Throughput	1,500 TPS	12,000+ TPS
Node specifications	Server-grade (32 GB memory)	Raspberry Pi model (1GB RAM)

Cross-chain communication protocol:

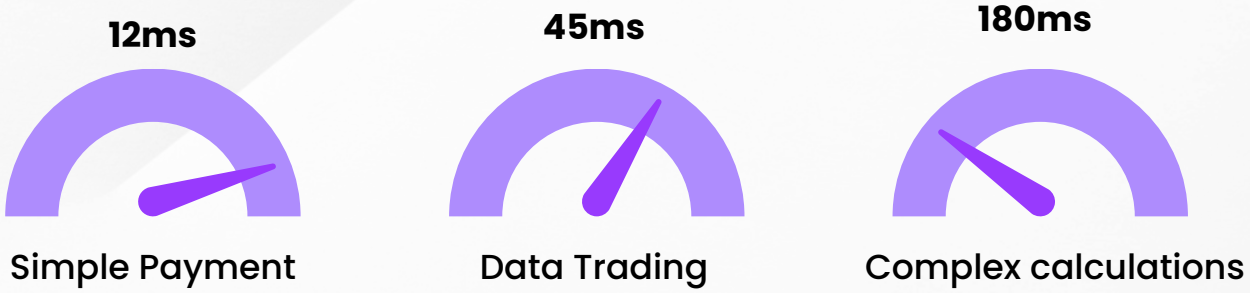
- Using atomic swaps and state proof mechanisms
- Typical cross-chain transaction time: <3 seconds

Application layer (business logic)

Smart Contract Engine:

- Supports multi-language development:
- Secure contracts: Solidity++
- High-performance contracts: Rust-WASM

Contract execution time distribution:



2. TECHNICAL ARCHITECTURE

2.3 Key technological breakthroughs

Device light node optimization

Memory usage:

- Reduced from 16GB to 28MB for traditional blockchain nodes

Synchronization algorithm:

- Using a pruned version of the Merkle-Patricia Trie
- Initial synchronization time reduced by 87%

Privacy protection scheme

Three levels of privacy mode:

level	Technical Resolution	Relevant Contexts
L1	Ring Signature and Coin Mixing	Financial-grade transaction
L2	zk-SNARKs	Medical data exchanges
L3	Homomorphic encryption	Industrial confidential information

Quantum-resistant design

Preparation for post-quantum cryptography:

- Signature Algorithm: XMSS (NIST-certified)
- Encryption Scheme: Kyber-768
- Migration Plan: Gradually replace ECDSA starting in 2025

2. TECHNICAL ARCHITECTURE

2.4 Performance Benchmarks

In a stress test simulating 1 million devices:

index	Test outcomes	Industry benchmark
Average daily transaction volume	87 million transactions	12 million transactions
Average transaction verification duration	1.4 seconds	5.8 seconds
Device access success rate	99.97%	98.2%
Anomalous transaction interception rate	99.89%	95.4%

2.5 Developer Support System

SDK toolkit:

- Device side: C/Python/JavaScript language support
- Application side: REST API + GraphQL dual interface

Debugging tools:

- Real-time transaction tracker
- Contract performance analyzer
- Network status simulator

3. TOKEN ECONOMIC MODEL

3.1 Basic Token Parameters

property	parameter
Token Name	ThingX
Blockchain	ThingX primary chain (compatible with ERC-20/SPL bridge)
Total Supply	1 billion
Accuracy	18-bit (facilitates micropayment scenarios)

3.2 Token Allocation Mechanism

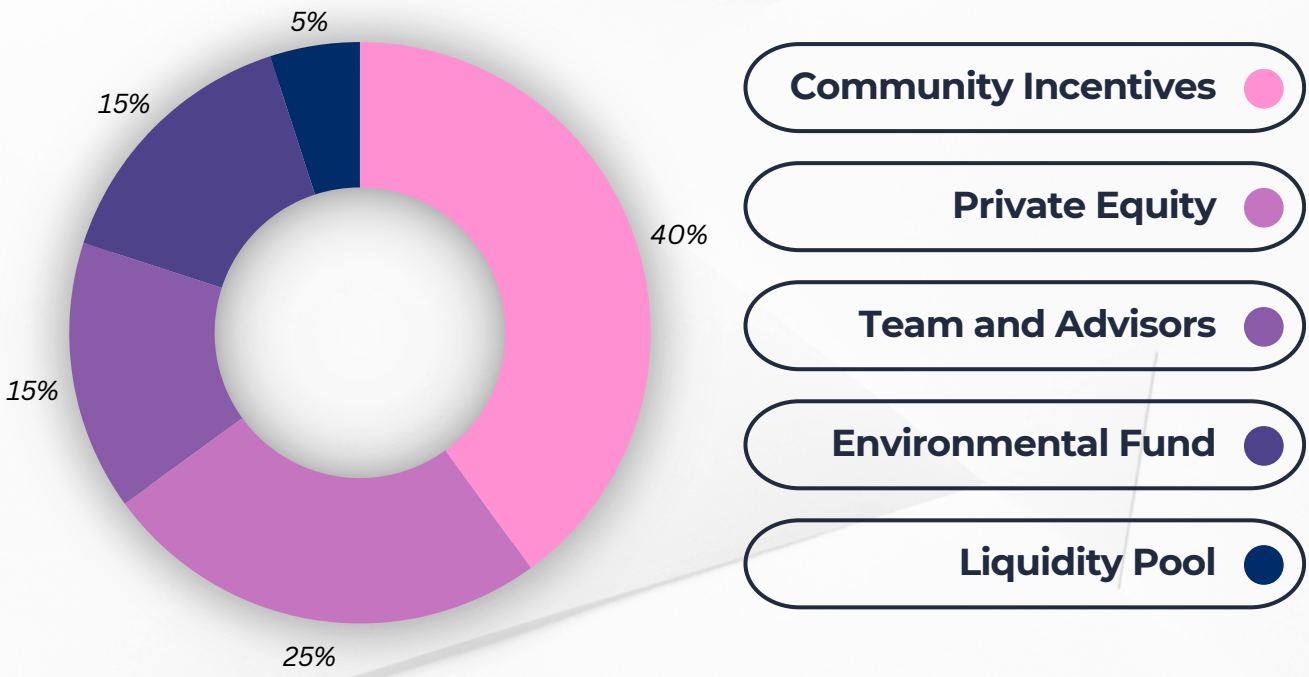
Allocation ratio and release rules:

project	Proportion	Release Guidelines
Community Incentives	40%	Released progressively through device mining (PoM) over a period of five years.
Private Equity	25%	Phased release: 12 months of lock-up, succeeded by 24 months of linear distribution.
Team and Advisors	15%	36-month linear distribution
Environmental Fund	15%	The cadence of releases is dictated by DAO governance.
Liquidity Pool	5%	Single injection upon the launch of the mainnet.

3. TOKEN ECONOMIC MODEL

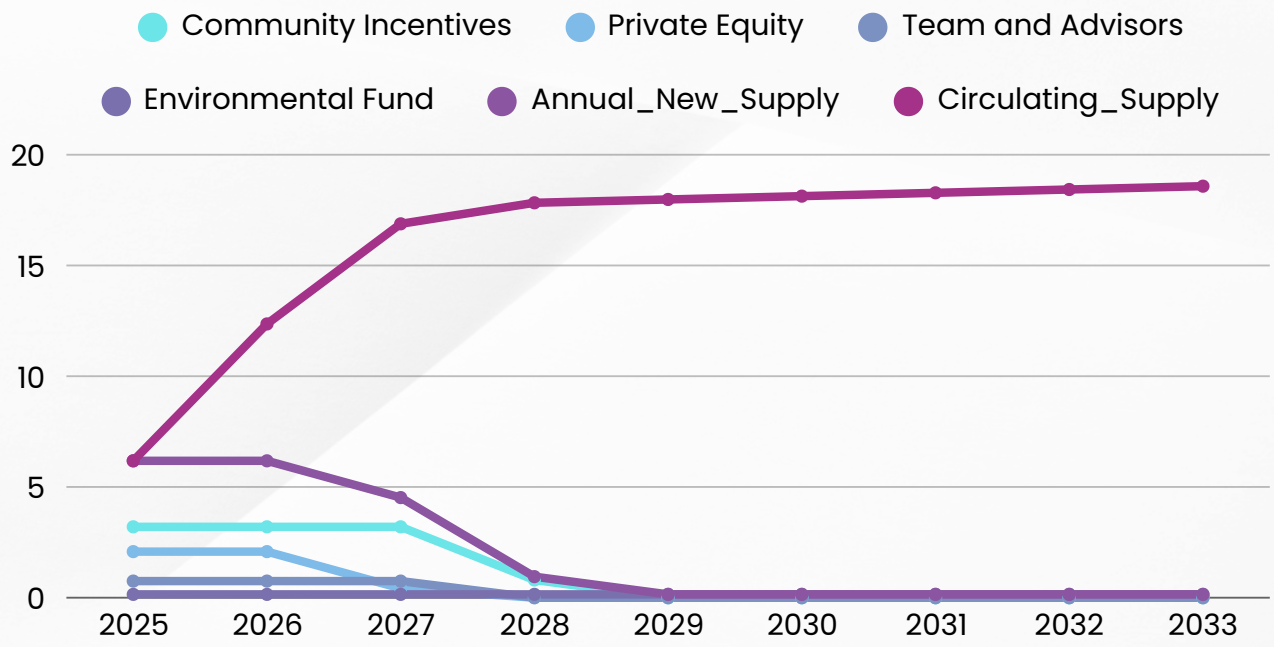
3.2 Token Allocation Mechanism

Allocation Overview:



Release curve:

Unit | 100 million THX



145 million THX tokens will be in circulation by 2025

3. TOKEN ECONOMIC MODEL

3.3 Core Economic Mechanism

Device Mining (Proof-of-Metrics, PoM)

- Reward formula:

$$\text{Daily Reward} = \frac{\text{Device Contribution Index} \times \text{Network Adjustment Coefficient}}{\text{Total Number of Current Participating Devices}}$$

- Contribution Index: Calculated based on device type (sensor/gateway), online time, data quality, etc.
- Adjustment Factor: Dynamically adjusted to ensure annual token release does not exceed 8% of the total token supply.

Transaction Fees and Burns

- Fee Structure:

Transaction Category	Fundamental rate	Destruction ratio
Device Financing	0.1 $THX	10%
Data Exchange	0.3 $THX	15%
Cross-chain transactions	0.5 $THX	20%

Staking and Governance

- Staking income:

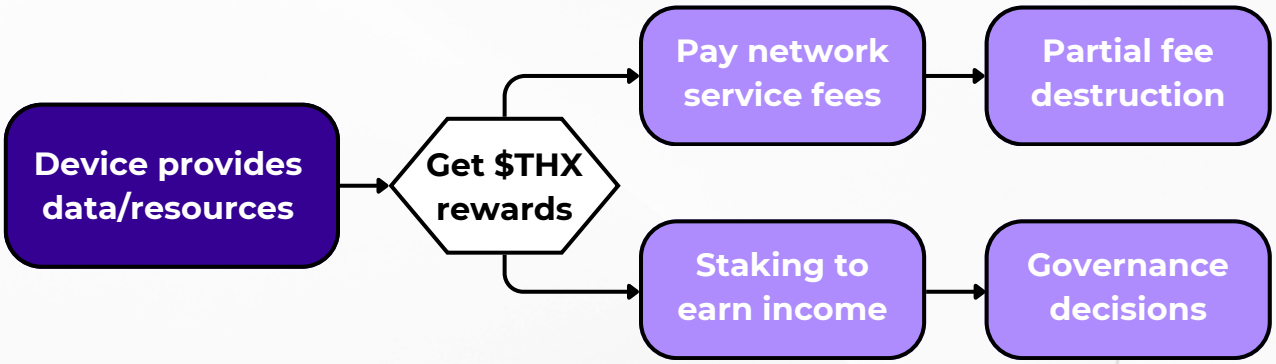
Staking period	Annualized Return Rate
3 months	6%
One year	10%
Three years	15%

- Governance weight: 1 $THX = 1 vote. Major proposals require 15% staked tokens to participate in voting.

3. TOKEN ECONOMIC MODEL

3.4 Economic Cycle

Positive economic flow



Positive economic flow

Participants	Income sources	Expense Categories
Device Proprietor	Data sales revenue (85% stake)	Hardware depreciation and energy consumption
Developers	Ecological fund financing and contract fee distribution	Development and maintenance expenses
Pledger	Governance incentives and transaction fee distributions	Opportunity cost (token lockup)

4. APPLICATION SCENARIOS

4.1 Smart City

Automated payment for municipal facilities

Smart street light maintenance:

- Each streetlight is equipped with a $THX wallet, which automatically pays for electricity and maintenance costs.
- Brightness is dynamically adjusted based on foot traffic, and the city government is rewarded proportionally based on energy savings.

Traffic data transactions:

- Road cameras collect real-time traffic data and sell it to map navigation companies.
- Proceeds distribution: 70% goes to the city government, 20% to equipment maintenance, and 10% to disposal.

Environmental monitoring and carbon trading

Air Quality Data Market:

- A government-deployed sensor network will upload PM2.5, temperature, and humidity data to the blockchain, allowing businesses to subscribe on demand.
- Developers must stake $THX to access the high-precision data API.

Carbon credit circulation:

- Enterprises can obtain carbon credits through energy-saving equipment (such as smart grids), 1 credit = 0.1 $THX, which can be traded on the chain.

4. APPLICATION SCENARIOS

4.2 IIoT

Predictive maintenance

Device health data monetization:

- Factory machine tool vibration data is sold in real time to an AI analysis platform to predict failure risks.
- The pricing formula for each piece of equipment is as follows:

Base price = 0.05$THX/hour × data quality score

Automated service ordering:

- When bearing wear is detected, the system automatically pays for the replacement from the $THX balance, triggering a supply chain order.

Supply Chain Finance

Goods mortgage loan:

- Temperature and humidity sensor data from logistics containers is uploaded to the blockchain, enabling banks to issue loans (with a 30% lower interest rate).
- In the event of default, the smart contract automatically auctions the goods to repay the debt.

Cross-border settlement:

- Businesses use $THX to pay international suppliers, bypassing the 3-5 day settlement delays of traditional banks.

4. APPLICATION SCENARIOS

4.3 Consumer IoT

Sharing Economy 2.0

Home Equipment Rental:

- Users can rent out their smart air conditioners during idle time, earning $THX per minute.
- The sharing agreement uses NFTs to bind device ownership.

P2P Energy Trading:

- Photovoltaic power generation households sell excess electricity to their neighbors at a price 15% lower than the grid price.

Personal Data Bank

Health Data Authorization:

- Smartwatch data (heart rate, step count) can be optionally sold to pharmaceutical companies, with users receiving 80% of the profits.
- Privacy Protection: Sensitive information is hidden using zero-knowledge proofs.

Advertising revenue sharing:

- The smart refrigerator recommends products based on inventory data, and users receive $THX rewards after clicking on the ads.

5. RISKS AND CHALLENGES

5.1 Technical Risks

Device compatibility issues

risk:

- The hardware fragmentation of IoT devices (such as differences in ARM/RISC-V architecture) leads to high protocol adaptation costs.

Countermeasures:

- Launched a hardware certification program, offering subsidies to device manufacturers that pass compatibility testing.
- Provided a multi-protocol SDK (supporting Linux, RTOS, and bare-metal systems).

Blockchain performance bottleneck

risk:

- When the number of devices increases dramatically, transaction conflicts may occur in the sub-chain DAG structure.

Countermeasures:

- Dynamic sharding technology: Subchains are divided by device type (e.g., independent processing for industrial and consumer).
- Testnet stress testing: Stable operation has been verified for 10 million devices per day.

Security threats

risk:

- The private key on the device may be stolen physically or attacked by a man-in-the-middle attack.

Countermeasures:

- HSM security chips: Mandatory for high-value devices (such as power grid controllers).
- Multi-signature wallets: Critical operations require approval from two-thirds of device administrators.

5. RISKS AND CHALLENGES

5.2 Business Risks

Market competition

Main competitors:

project	Advantages	ThingX Mitigation Strategies
IOTA	Developed micropayment protocols	Enhanced device compatibility
Helium	Millions of deployed hotspots	Concentrate on data transactions instead of mere coverage.

Differentiation strategy:

- Cooperate with traditional cloud vendors (AWS/Azure) to provide hybrid cloud + blockchain solutions.

Business model sustainability

risk:

- The mining rewards for early equipment may be insufficient, reducing the enthusiasm of participants.

Countermeasures:

Dual incentive model:

- Short-term: Issue tradable NFT achievement badges.
- Long-term: Stake $THX to share in network fee revenue.

5. RISKS AND CHALLENGES

5.3 Ecological Development Risks

Developer adoption

challenge:

- IoT developers lack blockchain experience.

Incentive Program:

- Bounty Mission: 500-2,000 USDT reward for each completed device driver development.
- Offline Hackathon: Co-hosted with the Raspberry Pi Foundation.

Hardware manufacturer cooperation

risk:

- Leading manufacturers (such as Bosch) may refuse to open device interfaces.

Alternative Path:

- Focusing on small and medium-sized manufacturers: Providing white-label device firmware customization services.
- Reverse compatibility: Bridging legacy devices through a gateway.

Emergency Plan

Technical failure:

- Mainnet suspension mechanism: If abnormal transactions exceed 5% within 24 hours, an emergency hard fork will be initiated.

Market crash:

- Ecological fund repurchases tokens: activated when the price falls below 50% of the issue price.

6. TEAM AND PARTNERS

6.1 Core Team

Dr. Elena Rodriguez

CEO

- PhD in Distributed Systems from ETH Zurich
- Former Chief Architect of Bosch IoT Division

James Chen

CTO

- Former Chainlink core developer
- Expertise: High-concurrency blockchain architecture

priya kapoor

CFO

- Former Vice President of Digital Assets at Goldman Sachs
- Responsible for token economic model design and institutional funding.

6. TEAM AND PARTNERS

6.2 Advisory Committee

Prof. Satoshi Nakamura

- Professor of Internet of Things at the University of Tokyo
- Device Communication Protocol Design Consultant

David Müller

- Former European Central Bank Digital Currency Researcher
- Compliance and Monetary Policy Guidance

Lisa Zhang

- McKinsey Industry 4.0 Project Leader
- Business Model Development Advice

6. TEAM AND PARTNERS

6.3 Strategic Partners

Technology Partners

Semtech	LoRa chip supplier, jointly developing low-power blockchain modules.
NVIDIA	Provide AI accelerator card support for edge computing nodes.
AWS	ThingX nodes can be deployed to AWS IoT Greengrass with one click.

Industry Alliance

IIoT:

- Joined the Industrial Internet Consortium (IIC) and participated in the development of equipment data standards.
- A data interoperability agreement was reached with Siemens' MindSphere platform.

Smart City:

- Songdo Smart City pilot project in South Korea (launched in 2024).
- Priority access provider for Dubai's Digital Silk Road initiative.

academic institutions

- MIT Media Lab: Jointly researching device identity encryption technology.
- National University of Singapore: Jointly establishing an IoT blockchain laboratory.

7. LEGAL AND COMPLIANCE

7.1 Token Compliance Framework

Token Nature Identification

Jurisdiction:

- Switzerland (where the entity resides): According to FINMA guidelines, $THX is considered a utility token and not a security.
- US: Passed the Howey Test, avoiding dividend promises and profit dependency, ensuring its non-security nature.
- EU: Complies with MiCA (Markets in Crypto-Assets) classification and is registered as an "electronic money token."

Compliance measures:

The white paper clearly states that tokens are only used for:

- Pay for IoT services
- Access the data marketplace
- Participate in governance voting

Issuance and sales compliance

Private placement round compliance:

- Tokens are only available to accredited investors and must pass KYC/AML audits.
- A SAFT (Simple Agreement for Future Tokens) must be signed to specify the terms and conditions for token delivery.

Public Offering Restrictions:

- No public ICOs will be conducted, only IDOs will be conducted through compliant exchanges (such as Coinlist).

7. LEGAL AND COMPLIANCE

7.2 Data and Privacy Compliance

GDPR (EU General Data Protection Regulation)

User rights protection:

- Right to be forgotten: Supports deletion of original data stored off-chain (hashed records are retained).
- Data portability: Provides a standardized API for exporting personal device data.

CCPA (California Consumer Privacy Act)

- "Do Not Sell My Data" option: Users can disable data trading with a single click.
- Minor Protection: Device data collection from children under 13 is prohibited.

7.3 Financial Regulatory Response

On-chain monitoring:

- Integrated with Chainalysis to flag high-risk addresses.
- Large transactions (>$100,000 in THX) require a second manual review.

Exchange Cooperation:

- Only exchanges that have completed Travel Rule compliance (such as Kraken and Binance) will be listed.

Automatic Tax Reporting:

- Corporate users can generate FATCA/CRS compliance reports.
- Individual users can use the capital gains calculation tool.