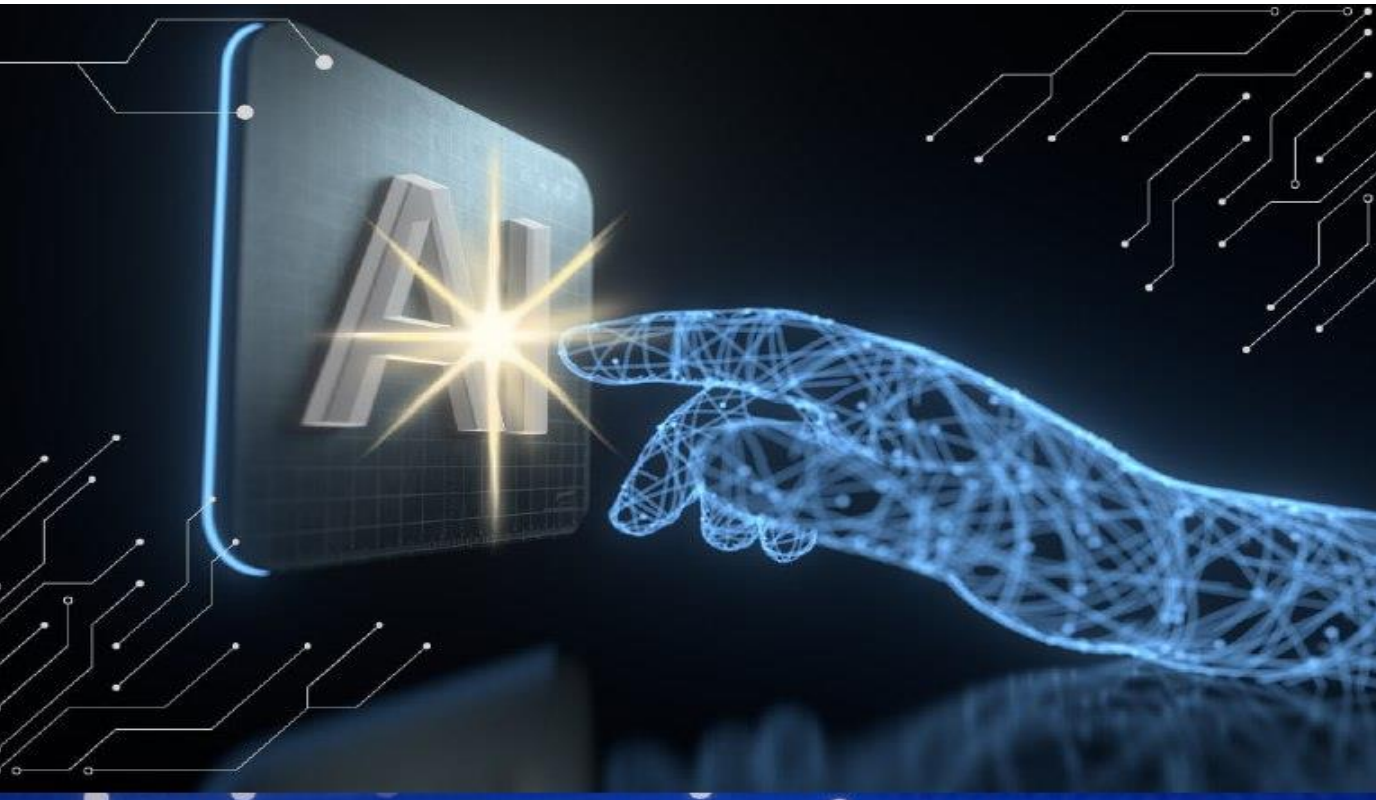
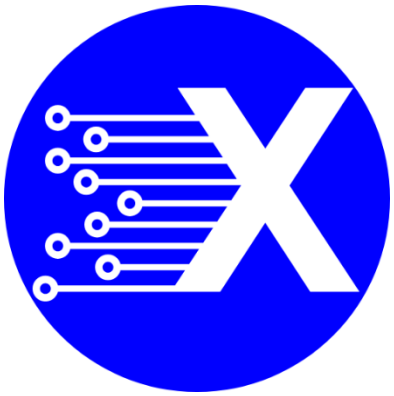


StreamDataX

WhitePaper

StreamDataX (SDX) WhitePaper



Decentralized Marketplace for Data Streams and Insights. Share, Access, and Unlock the Power of Secure Digital Data.

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1. Abstract

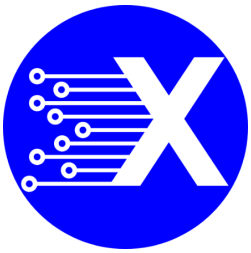

Figure 1-1. SDX Logo

StreamDataX represents a paradigm shift in the data economy, offering a decentralized platform that empowers data providers and consumers alike.

By integrating blockchain technology, decentralized storage, and an innovative SDX Token model, it addresses critical challenges such as data ownership, security, and monetization.

The platform ensures that data providers retain control over their assets while unlocking new revenue streams, and data consumers gain access to high-quality, verified datasets that drive informed decision-making and innovation across key industries such as agriculture, AI, and healthcare.

With its robust architecture, transparent workflows, and commitment to scalability, StreamDataX is set to lead the way in building a transparent and equitable data marketplace. The platform's roadmap underscores its dedication to continuous improvement, emphasizing user-centric design, cross-chain ompatibility, and ecosystem growth. As StreamDataX evolves, it is poised to redefine the way data is exchanged and utilized globally, shaping a future where data becomes a truly democratized asset, fostering innovation and collaboration on an unprecedented scale.

This document provides an in-depth overview of the system architecture for the StreamDataX platform. It details the design principles, core components, and workflows for both sellers and buyers.

Additionally, it covers the technical stack, blockchain integration, and security implementations.

2. Introduction

Data is one of the most valuable assets of the modern world, driving innovation across industries such as agriculture, healthcare, artificial intelligence (AI), logistics, and scientific research. However, the current methods of sharing, accessing, and monetizing data are heavily reliant on centralized platforms that control access, enforce restrictive policies, and introduce high costs for both data providers and consumers. These centralized systems often lack transparency, limit ownership rights, and create barriers to participation for smaller stakeholders.

As data becomes increasingly critical for developing smarter solutions, predictive models, and real-time decision-making tools, there is a growing need for a secure, decentralized, and user-controlled ecosystem that empowers individuals, organizations, and enterprises to share, monetize, and access data efficiently.

StreamDataX is designed to address these challenges by providing a blockchain-based protocol for decentralized data exchange. It enables data providers to maintain ownership and control over their data, whether sensitive or non-sensitive, while allowing buyers to access trusted, verifiable datasets through automated, transparent smart contracts. By integrating decentralized storage, tokenized access rights, and a robust licensing system, StreamDataX creates a global marketplace where data flows freely, securely, and fairly—unlocking new possibilities for innovation across multiple sectors.

3. Architecture

The architecture of StreamDataX is designed to provide a robust, scalable, and secure platform for decentralized data exchange.

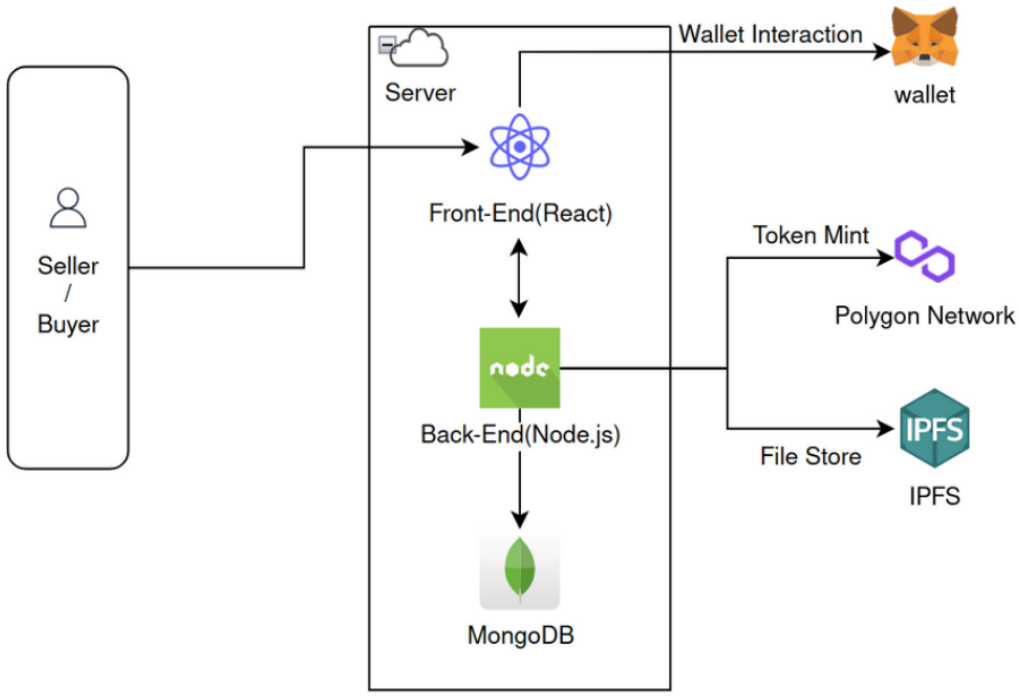

Figure 3-1. High-level Architecture

The backend of the StreamDataX platform is the central hub that connects users, the blockchain, and decentralized storage systems. It is responsible for managing the flow of data and ensuring smooth interactions between different components of the system.

The SDX Token serves as the cornerstone of StreamDataX, a decentralized data marketplace designed to revolutionize the way data is monetized, accessed, and shared. With a focus on key sectors such as agriculture, artificial intelligence (AI), and healthcare, the platform

leverages blockchain technology to ensure transparency, security, and efficiency for all participants.

StreamDataX envisions a future where data becomes a truly democratized asset, empowering individuals and businesses to harness its full potential without compromising privacy or security. By leveraging blockchain technology and decentralized principles, StreamDataX aims to eliminate intermediaries, reduce inefficiencies, and foster trust in data exchange. Our goal is to create a seamless ecosystem where data providers retain control over their assets while unlocking new revenue streams, and data consumers gain access to high-quality, verified datasets for innovation and decision-making. StreamDataX aspires to lead the global shift towards a transparent, secure, and equitable data economy, driving advancements across industries and catalyzing a new era of data-driven collaboration.

By combining blockchain technology with decentralized storage and modern web frameworks, StreamDataX ensures seamless integration, efficient operations, and a user-friendly experience.

Below are the key components of the platform architecture:

3.1 Blockchain Layer

Blockchain Network: Built on Polygon for scalability, low transaction costs, and high throughput. Plans for multichain support are under consideration to ensure broader ecosystem compatibility.

3.2 Smart Contracts

3.2.1 SDX Token (ERC-20) Contract (Under Development)

The SDX Token is the native utility token for the StreamDataX platform, a decentralized data marketplace aimed at revolutionizing how data is monetized, accessed, and shared.

Designed for industries such as agriculture, AI, and healthcare, SDX ensures transparency, security, and efficiency for both data providers and consumers.

The SDX Token contract will support various functions, including transactions, staking, governance, and incentivization, forming an integrated ecosystem for data exchange.

It will enable seamless transactions between data providers and buyers, with staking mechanisms for earning rewards, governance rights for community decisions, and incentives for data contributions and liquidity provision.

With a fixed supply of 2 billion tokens, the contract's tokenomics will balance scarcity with liquidity, promoting ecosystem growth, long-term value, and community engagement, while driving innovation in a decentralized marketplace.

3.2.2 Data Token (ERC-1155) Contract

The DataToken contract is an ERC-1155 implementation designed for tokenizing datasets and integrating with decentralized marketplaces. It links dataset tokens to unique metadata stored on IPFS, ensuring secure and immutable data referencing.

The contract allows creators to define attributes like pricing, encryption status, and transferability rules. Core features include minting tokens, updating attributes, and secure token transfers governed by predefined rules. Only authorized marketplace smart contracts can initiate these actions, ensuring a controlled environment. Role-based pausing adds operational security, and integration with external marketplaces facilitates seamless token lifecycle management.

This contract ensures trust, transparency, and efficient marketplace interoperability for decentralized data tokenization.

3.2.3 Marketplace Contracts

The Marketplace contract enables the creation, management, and trade of dataset tokens by interacting with the DataToken contract. It acts as an intermediary between token creators and buyers, offering functions to mint tokens, manage metadata, and facilitate token transfers. Using role-based access control and non-reentrancy mechanisms, the contract ensures secure and restricted administrative actions.

Key features include minting new dataset tokens management to the DataToken contract, the marketplace ensures seamless integration and compliance with ERC-1155 standards, fostering a secure and transparent environment for decentralized data transactions.

3.2.4 Licensing & Access Control Contract (Under Development)

The License & Access Token Data contract is designed to regulate the secure access and usage of datasets through license-based tokens, ensuring compliance with the user agreement of StreamDataX.

This contract will govern licensing terms, providing non-exclusive, non-transferable licenses to token holders for specific uses such as research, analytics, or AI training. It will enforce restrictions on reselling, redistribution, and unauthorized use, while defining license duration, access limitations, and geographic restrictions.

Additionally, the contract will manage pricing, payments, and renewals, promoting transparent and fair transactions. To protect data and intellectual property, it will implement confidentiality measures, data security protocols, and compliance audits. Termination clauses for license breaches and arbitration

mechanisms for dispute resolution will further ensure accountability and trust in the decentralized data marketplace.

3.3 Backend

The backend architecture of StreamDataX is built to provide a high-performance, scalable, and secure environment, utilizing Node.js for its asynchronous, non-blocking capabilities.

MongoDB serves as the primary database, storing flexible metadata for datasets, user data, and transactions. Node-cache is integrated for in-memory caching, ensuring fast access to frequently requested data, while Busboy handles efficient file uploads with minimal memory usage. Files are processed into chunks, compressed, and stored on IPFS, with optional encryption for added security.

The Key Management Service (KMS) is used to securely handle private keys, ensuring data confidentiality.

Real-time communication is achieved with Socket.io, enabling instant notifications and updates for dataset transactions, usage monitoring, and auction-style bidding.

The backend leverages load balancing and distributed caching to ensure scalability and consistent performance during high-demand periods. Data integrity is maintained with robust database design, indexing, and regular backups.

JWT is used for secure authentication and authorization, while a RESTful API supports interactions such as dataset uploads, metadata retrieval, and transaction management, making the backend both secure and user-friendly.

3.4 Frontend

The frontend of StreamDataX serves as the primary interface through which users interact with the platform. Built using React and

TypeScript, it offers a seamless, intuitive experience that facilitates secure and efficient user transactions and data management.

The frontend integrates with users' wallets, enabling them to make blockchain-based transactions, such as dataset purchases, directly from their interface. This ensures that userscan manage their assets and interact with the backend in real time.

Additionally, the frontend is designed with scalability and responsiveness in mind, allowing it to handle a wide range of user interactions without compromising performance or usability. The frontend communicates with the backend via a RESTful API, ensuring smooth integration with the underlying blockchain system. Through real-time notifications powered by Socket.io, users can track the status of their transactions, dataset uploads, and other interactions.

The React-based architecture allows for efficient state management and real-time updates, while TypeScript enhances code maintainability and developer productivity.

Security is prioritized, with encrypted connections and user authentication handled by JWT tokens, ensuring that sensitive data remains protected throughout the user's journey on the platform.

This approach ensures that the frontend not only provides an engaging user experience but also upholds the integrity and security of the entire blockchain ecosystem.

3.5 Decentralized Storage

StreamDataX utilizes decentralized storage solutions to ensure secure, scalable, and immutable data management. IPFS (InterPlanetary File System) is employed for storing public datasets, offering a decentralized and tamper-proof method of data storage, ensuring data integrity and transparency.

For more secure and large-scale storage with retrieval guarantees, Filecoin is integrated, providing an additional layer of reliability and scalability. Sensitive data is encrypted and key is stored off- chain, with access controlled through encryption keys, ensuring confidentiality and data protection. Public datasets, on the other hand, are directly accessible from IPFS or Filecoin via secure links, allowing for seamless and transparent access while maintaining the decentralized nature of the platform.

This dual-layer storage strategy provides a robust and secure environment for both public and private data, fostering trust and efficiency within the StreamDataX ecosystem.

4. Workflow

4.1. Seller Work Flow

The seller uploads the dataset to IPFS/Filecoin and receives a CID. Metadata for the token (pricing, access level, etc.) is defined.

A minting transaction creates a token tied to the dataset. The token is listed on the marketplace for buyers.

4.1.1 Upload Process

Seller chooses whether data is sensitive during upload.

4.1.2 Non-sensitive Data

- Direct IPFS storage
- Token minting
- Marketplace listing

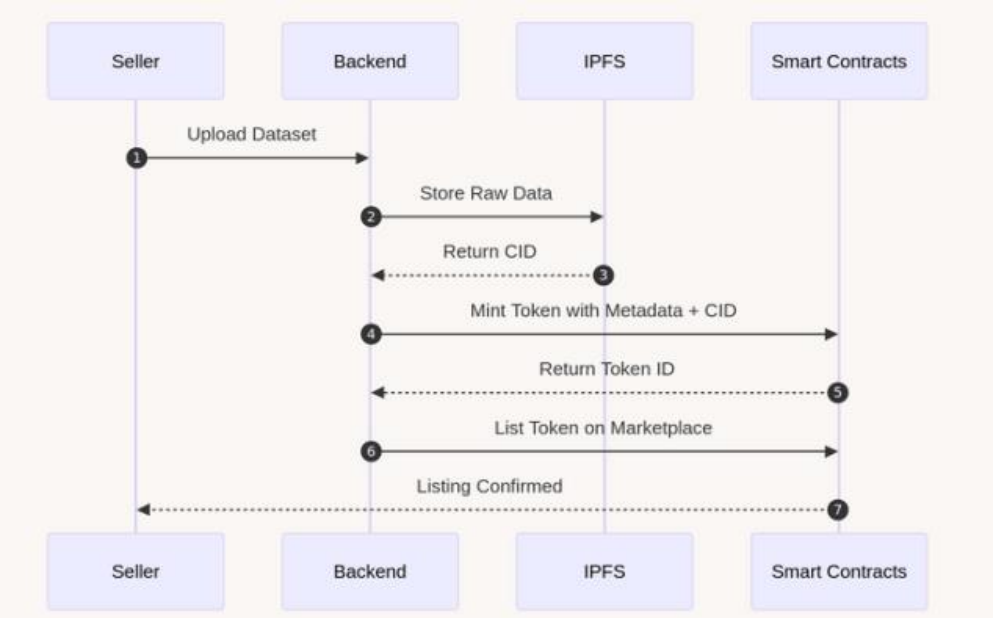

Figure 4-1. Seller Non-sensitive Data Flow

4.1.3 Sensitive Data

- Encryption key generation
- Data encryption
- Key storage off-chain
- IPFS storage of encrypted data
- Token minting with encryption flag

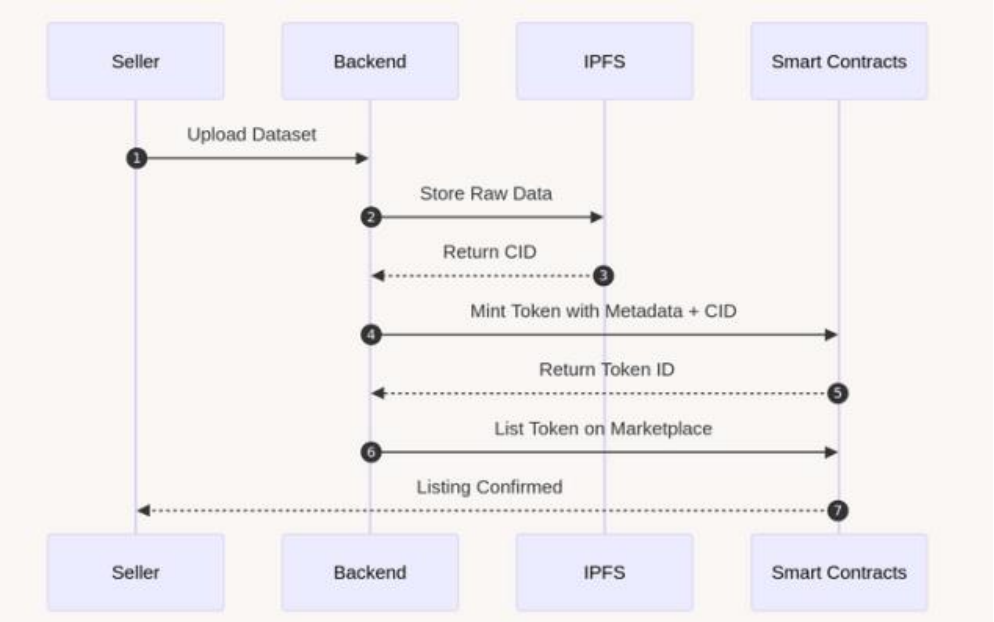

Figure 4-2. Seller Sensitive Data Flow

4.2 Buyer Work Flow

The buyer browses and selects a dataset.

After reviewing details, they pay for the token using cryptocurrency.

The token is transferred to the buyer's wallet.

The buyer requests access, which is validated by the smart contract.

4.2.1 Upload Process

- Browse marketplace
- Purchase token

4.2.2 Non-sensitive Data

- Direct IPFS retrieval after token transfer

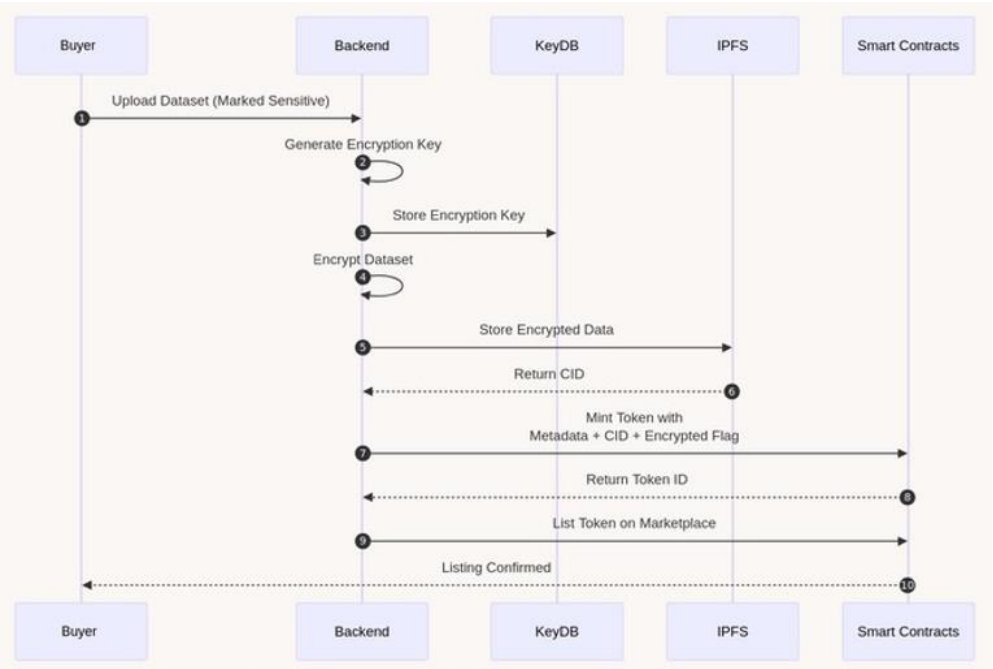

Figure 4-3. Buyer Non-sensitive Data Flow

4.2.3 Sensitive Data

- Token transfer
- Key access grant
- Data decryption

- Secure delivery to buyer

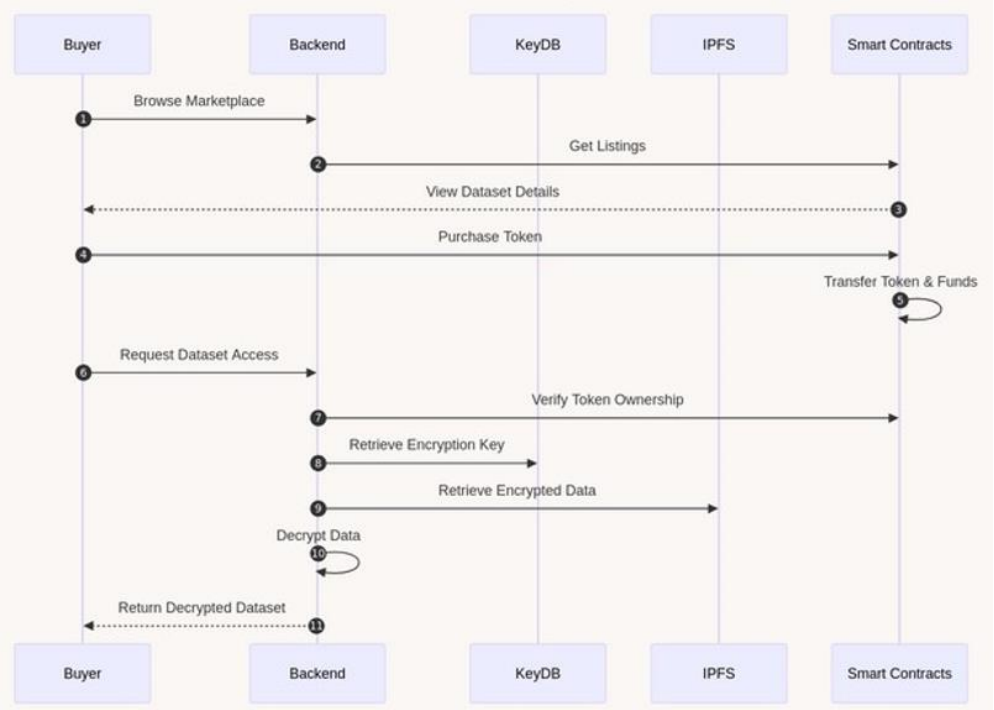

Figure 4-4. Buyer Sensitive Data Flow

5. Security Implementation

5.1 Smart Contract Security

- Implementation of OpenZeppelin security contracts
- Regular security audits
- Rate limiting for sensitive operations
- Multi-signature requirements for critical functions

5.2 API Security

- Request rate limiting
- Input validation and sanitization
- CORS policy implementation
- API key authentication
- Request encryption
- SSL/TLS enforcement

5.3 Data Security

- End-to-end encryption for sensitive data
- Secure key management
- Access control lists
- Audit logging
- Data integrity verification

6. Technical Stack

6.1 Blockchain Layer

- Network: Polygon (Primary), Ethereum (Bridge capability)
- Development Framework: Hardhat
- Testing: Mocha, Chai, Solidity Coverage
- Security Analysis: MythX, Slither, Openzeppelin

6.2 Backend Layer

- Runtime: Node.js 22+
- Framework: Express.js
- Database: MongoDB with Mongoose
- Caching: Redis/NodeCache
- Storage: IPFS/Filecoin

6.3 Frontend Layer

- React js with TypeScript:18+
- State Manger: Redux
- UI Components: Bootstrap and Material Ui

Figure 6-1. Folder Structure

7. SDX Token

The SDX Token serves as the cornerstone of StreamDataX, a decentralized data marketplace designed to revolutionize the way data is monetized, accessed, and shared. With a focus on key sectors such as agriculture, artificial intelligence (AI), and healthcare, the platform leverages blockchain technology to ensure transparency, security, and efficiency for all participants.

StreamDataX envisions a future where data becomes a truely democratized asset, empowering individuals and businesses to harness its full potential without compromising privacy or security. By leveraging blockchain technology and decentralized principles, StreamDataX aims to eliminate intermediaries, reduce inefficiencies, and foster trust in data exchange.

7.1 Token Overview

- Name: StreamDataX Token (SDX)
- Type: ERC-20 (Polygon Network)
- Total Supply: 2,000,000,000 SDX
- Initial Circulating Supply: 60,000,000 SDX (3%)

7.2 Core Functions

- Platform transaction medium

SDX is used to buy and sell datasets on the platform.

- Staking and validation

Users can stake SDX tokens to earn rewards.

The SDX staking mechanism forms the backbone of our platform's security, governance, and value creation model. Our unique Proof-of-

Stake system combines traditional staking benefits with specialized data validation incentives.

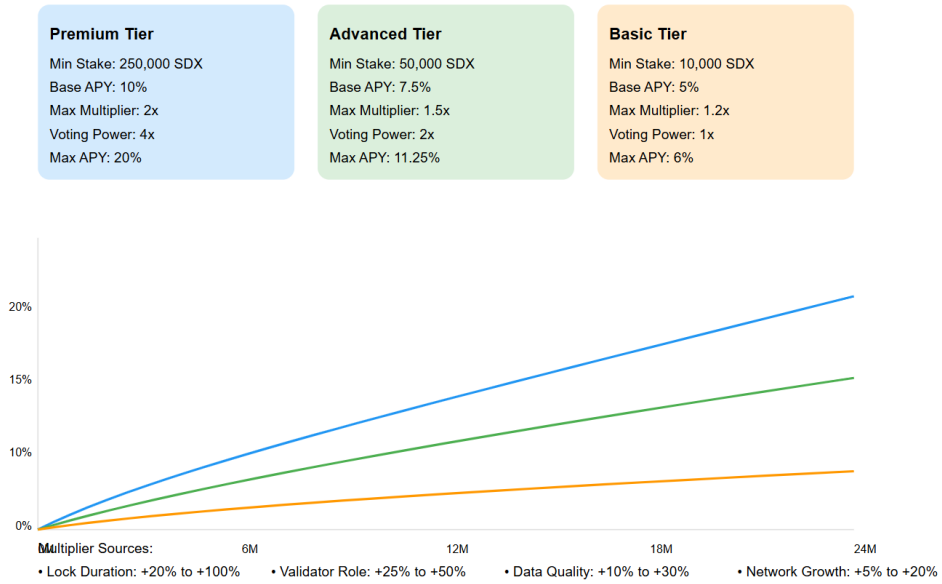

Figure 7-1. Staking Rewards Structure Visualization

- Governance participation

SDX holders can stake tokens to gain voting rights, influencing key decisions in the StreamDataX platform.

- Data quality assurance

Participants earn SDX tokens for contributing data, providing liquidity, or validating datasets.

8. Token Distribution

The SDX Token is the native utility token of StreamDataX, a decentralized data marketplace. It facilitates transactions, incentivizes participation, and governs the ecosystem.

8.1 IDO Allocation (8% - 160M SDX)

- Private Sale: 80M SDX
  * Price: $0.15
  * Vesting: 10% TGE, 6-month linear
- Public Sale: 60M SDX
  * Price: $0.20
  * Vesting: 15% TGE, 3-month linear
- Launch Liquidity: 20M SDX
  * Immediate deployment
  * 2-year lock

8.2 Team & Advisors (20% - 400M SDX)

- Core Team: 300M SDX
  * 12-month cliff
  * 36-month linear vesting
- Advisors: 100M SDX
  * 6-month cliff
  * 18-month linear vesting

8.3 Ecosystem & Community (30% - 600M SDX)

- Staking Rewards: 200M SDX
- Community Growth: 200M SDX
- Data Provider Incentives: 200M SDX

8.4 Liquidity & Exchange (10% - 200M SDX)

- DEX Liquidity: 100M SDX
- CEX Listings: 100M SDX

8.5 Treasury & Development (32% - 640M SDX)

- Reserve Fund: 300M SDX
- Future Development: 340M SDX

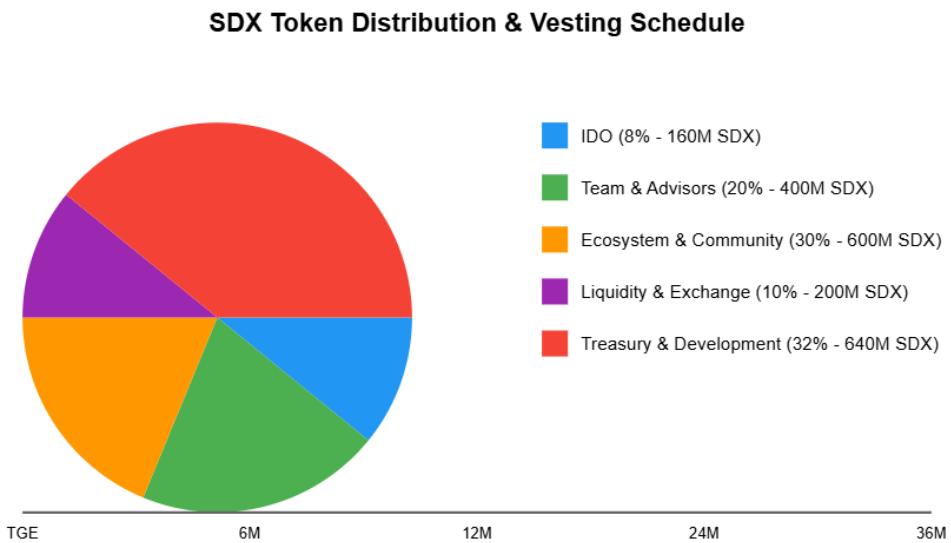

Figure 8-1. SDX Token Distribution & Vesting Schedule

9. Roadmap

The SDX Token is the native utility token of StreamDataX, a decentralized data marketplace. It facilitates transactions, incentivizes participation, and governs the ecosystem.

9.1 Phase 1: Foundation & Launch (Q1 - Q2 2025)

– Tokenomics Optimization

Design SDX's utility model (staking, fees, governance, and incentives).

– Smart Contract Deployment

Deploy SDX on Polygon PoS (EVM-compatible) with audit certification.

– Liquidity Bootstrapping

Launch SDX-ETH and SDX-MATIC pools on Uniswap & QuickSwap.

– Platform Alpha Release

Basic marketplace features for data providers & consumers.

– Early Partner Onboarding

Secure data providers in AI, healthcare, and agriculture sectors.

9.2 Phase 2: Expansion & Adoption (Q3 - Q4 2025)

– Polygon zkEVM Migration

Improve scalability & reduce costs for large-scale data transactions.

– Staking & Yield Farming

Enable SDX staking with dynamic APY & LP incentives.

– CEX Listings

Get SDX listed on KuCoin, Gate.io, and MEXC.

– Cross-Chain Bridge

Connect SDX to BNB Chain, Ethereum, and Solana via Polygon Bridge.

– Decentralized Storage Integration

Implement Filecoin/IPFS for secure data storage.

– Enterprise Adoption

Collaborate with AI labs, research institutes, and DeFi protocols.

9.3 Phase 3: Governance & Utility Growth (Q1 - Q2 2026)

– SDX DAO Launch

Introduce decentralized governance, allowing token holders to vote on platform upgrades.

– Premium Data Marketplace

Enable tiered access to high-value datasets (AI models, medical research, climate data, etc.).

– Regulatory Compliance

Implement privacy-preserving data sharing (align with GDPR, CCPA).

– NFT Data Tokenization

Introduce Data NFTs, ensuring verifiable ownership & monetization.

– Polygon DeFi Integrations

Collaborate with Aave, Balancer, and Polygon ID for identity-linked data access.

– Tier 1 Exchange Listings

Target Binance, Coinbase, Kraken for mainstream adoption.

9.4 Phase 4: Global Scale & Full Decentralization (Q3 - Q4 2026 & Beyond)

– Full Polygon zkEVM Adoption

Migrate to fully decentralized, zero-knowledge proof (ZKP) transactions.

– AI-Driven Data Curation

Implement AI-powered data validation & predictive analytics.

– Data Lending & Collateralization

Allow users to stake datasets in DeFi for loans.

– Token Buyback & Burn Mechanism

Introduce deflationary supply control for long-term value.

– Interoperability with Other L2s

Expand SDX ecosystem to Arbitrum, Optimism & Base.

– Multi-Industry Expansion

Extend beyond AI & healthcare into finance, climate tech, and metaverse data.

10. Conclusion

StreamDataX's tokenomics model, centered around our unique staking mechanism, creates a sustainable ecosystem that benefits all participants while ensuring platform security and data quality. Through careful implementation of these mechanisms and continuous community engagement, SDX aims to become the standard for decentralized data exchange.

StreamDataX represents a paradigm shift in the data economy, offering a decentralized platform that empowers data providers and consumers alike. By integrating blockchain technology, decentralized storage, and an innovative SDX Token model, it addresses critical challenges such as data ownership, security, and monetization. The platform ensures that data providers retain control over their assets while unlocking new revenue streams, and data consumers gain access to high-quality, verified datasets that drive informed decision-making and innovation across key industries such as agriculture, AI, and healthcare.

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