

# **T-Rex Technical Architecture**

## **Overview**

## T-Rex Tech Hub

### Layer 4 – Activation & Settlement

User Labeling

User Analysis

AI Matching Engine

toB User Service

### Layer 3 – Dapps & Builders

Provides an open and interoperable ecosystem for developers and partners to build on.

T-Rex Passport SDK

T-Rex Badge SDK

API Gateway

Extension Tools  
(ZKTLs Integration)

### Layer 2 – T-Rex 5D Persona Ecosystem

#### T-Rex Badge Certification

##### On-Chain Validators

- NFT
- Token
- Web3 Behavior

##### ZKTLs Validators

- Financial Standing
- Social Influence
- Digital Presence
- Subscriptions

##### Ecosystem Validators

- Event
- Identity
- Eligible

##### Social Validators

- Quests
- Social Behaviors

##### T-Rex Passport

- EVM wallets
- Solana wallets
- Social Media accounts

##### T-Rex Passport Assets

- Badges
- Points

### Layer 1 - T-Rex Chain Layer

#### Execution Layer

EVM-compatible Optimistic Rollup that processes transactions off-chain for massive scaling.

#### Sequencer Layer

Decentralized network of sequencers to batch and order transactions.

#### Data Availability Layer

Decentralized layer for transaction data publication, enabling state validation.

# 1. T-Rex Chain Layer Technical Architecture

The T-Rex Chain is an innovative Layer 2 (L2) solution designed to enhance the scalability, security, and interoperability of the Ethereum ecosystem. Built as an EVM-compatible Optimistic Rollup, it processes transactions off-chain and assumes they are valid by default. This allows for massive scaling and low transaction costs. Fraud proofs are used to identify and challenge invalid transactions within a specific window, ensuring that the chain remains secure by inheriting the robust security of the Ethereum mainnet. Our architecture is designed to be fully decentralized from the ground up, ensuring resilience and censorship resistance.

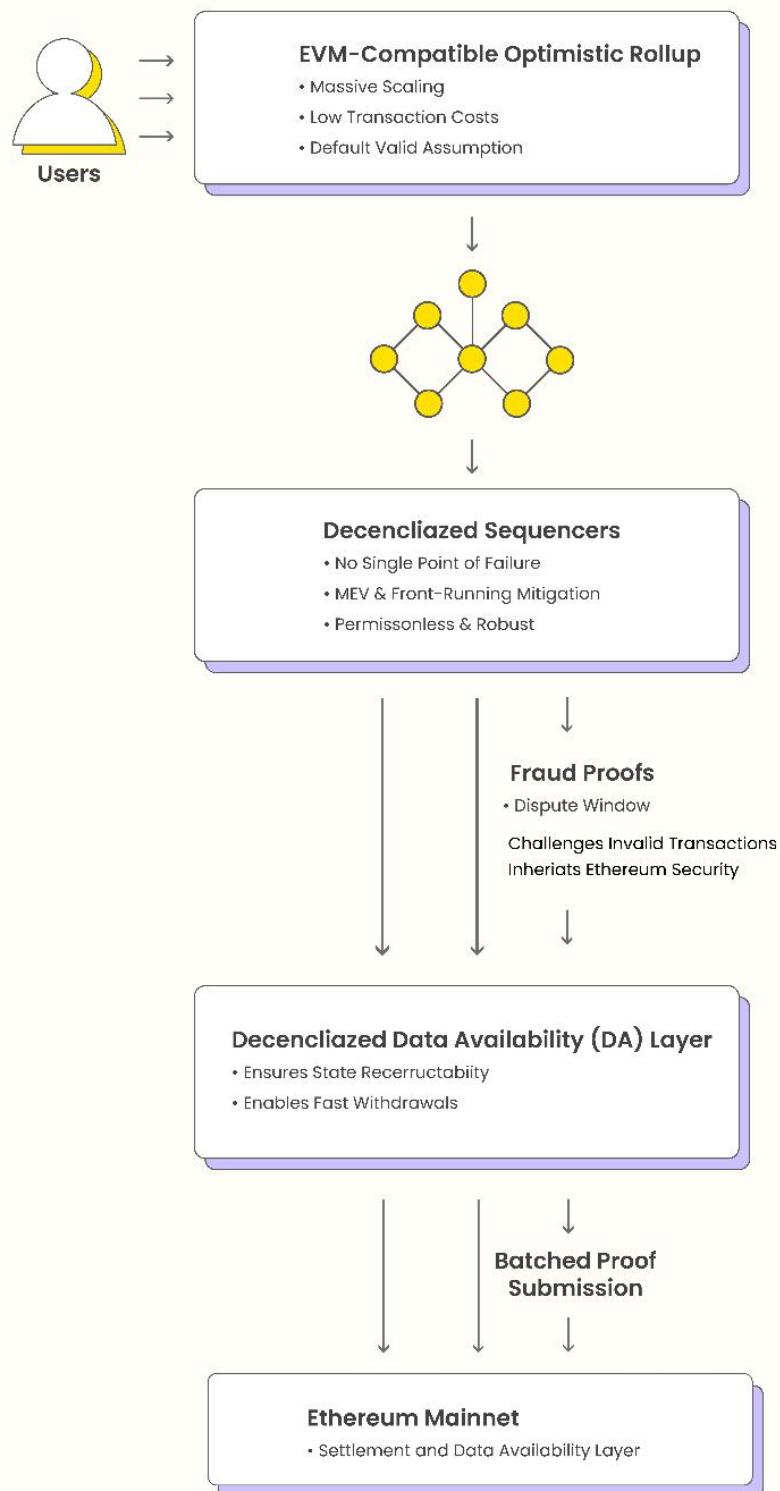
## Core Components of the T-Rex Chain:

- **Execution Layer (EVM-compatible Optimistic Rollup):** Our execution environment is a high-performance Optimistic Rollup that processes transactions off-chain. This allows for massive scaling, processing thousands of transactions per second (TPS) while submitting a single, concise proof to the Ethereum mainnet. The EVM-compatible design ensures seamless migration and development for existing Ethereum dApps and smart contracts.
- **Sequencer Layer (Decentralized):** Unlike centralized L2s, the T-Rex Chain employs a decentralized network of sequencers. These nodes are responsible for collecting, ordering, and batching transactions into blocks. This decentralized approach prevents single points of failure, mitigates front-running and MEV (Maximal Extractable Value) risks, and ensures the network remains permissionless and robust. Sequencers are selected and rewarded through a transparent, on-chain mechanism.
- **Data Availability Layer (Decentralized):** Transaction data is published to a decentralized data availability (DA) layer to ensure that any network participant can reconstruct the full state of the T-Rex Chain. This is a crucial security feature that allows for permissionless state validation and enables fast withdrawals. By separating

data publication from transaction execution, we significantly reduce the costs of data storage and further enhance scalability.

## **Chain Layer Architecture Diagram**

## T-Rex L2 Optimistic Rollup Chain Architecture



## Tooling Information

As the tooling layer of the ecosystem, we are committed to providing comprehensive support for developers. Here is the chain information for both the T-Rex Mainnet and Testnet to facilitate your integration and development.

Field	Mainnet	Testnet
Chain ID	1628	1962
Explorer	<a href="https://explorer.trex.xyz/">https://explorer.trex.xyz/</a>	<a href="https://testnet.trex.xyz/">https://testnet.trex.xyz/</a>
RPC URL	<a href="https://rpc.trex.xyz/">https://rpc.trex.xyz/</a>	<a href="https://testnetrpc.trex.xyz">https://testnetrpc.trex.xyz</a>
Bridge	<a href="https://bridge.arbitrum.io/?destinationChain=t-rex&amp;sourceChain=ethereum">https://bridge.arbitrum.io/?destinationChain=t-rex&amp;sourceChain=ethereum</a>	N/A
Altlayer	<a href="https://rollup-info.altlayer.io/matter-generate-parade/trex_mainnet">https://rollup-info.altlayer.io/matter-generate-parade/trex_mainnet</a>	N/A

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Explorer	<a href="https://explorer.trex.xyz/">https://explorer.trex.xyz/</a>	<a href="https://testnet.trex.xyz/">https://testnet.trex.xyz/</a>
RPC URL	<a href="https://rpc.trex.xyz/">https://rpc.trex.xyz/</a>	<a href="https://testnetrpc.trex.xyz">https://testnetrpc.trex.xyz</a>
Bridge	<a href="https://bridge.arbitrum.io/?destinationChain=t-rex&amp;sourceChain=ethereum">https://bridge.arbitrum.io/?destinationChain=t-rex&amp;sourceChain=ethereum</a>	N/A

	m	
<b>Altlayer</b>	<a href="https://rollup-info.altlayer.io/matter-generate-parade/trex_mainnet">https://rollup-info.altlayer.io/matter-generate-parade/trex_mainnet</a>	N/A

## 2. 5D T-Rex Persona Ecosystem Technical Architecture

The 5D T-Rex Persona Ecosystem is a multi-faceted system designed to transform a static on-chain identity into a dynamic, multi-dimensional digital persona.

### 2.1 T-Rex Passport: The Universal On-Chain DID

The T-Rex Passport is a singular, on-chain Decentralized Identifier (DID) for each user. It is a publicly visible smart contract that serves as the nexus of a user's digital life. Users can link multiple wallet addresses from various blockchain ecosystems, including EVM-compatible chains (like Ethereum, Polygon) and Solana. The T-Rex Passport also supports the binding of Web2 social accounts, creating a comprehensive and interoperable identity.

### 2.2 T-Rex Badge System: A Comprehensive Validation Engine

The T-Rex Badge System is a publicly visible, smart contract-based ecosystem that validates and mints badges based on a user's on-chain and off-chain activities. The system leverages three core types of validators:

**On-Chain Data Validators** This suite of validators analyzes a user's on-chain data across multiple networks to verify credentials.

- **NFT Validator:** Supports both ERC-721 and ERC-1155 data standards. It allows for the flexible configuration of validation conditions based on a user's NFT metadata, transfer history, holding duration, and DeFi transaction behavior. This enables the creation of badges for NFT collectors and digital art enthusiasts.
- **Token Validator:** This validator supports assets on Ethereum, EVM-compatible chains, and Solana. It provides a robust framework to create validation conditions based on a user's wallet balances, transaction history, and asset holding duration. This is essential for recognizing a user's financial contributions and stability.
- **Web3 Validator:** This validator tracks specific, verifiable on-chain behaviors, such as a user's interactions with designated smart contracts. It's a powerful tool for rewarding protocol participation and dApp usage.

## ZKTLs Validator

In deep collaboration with the Reclaim Protocol, the T-Rex Extension allows users to privately verify their Web2 assets and identities using Zero-Knowledge and TLS proofs. This validator enables the creation of badges based on a wide range of sensitive data without revealing the underlying information. Validated credentials include:

- **Financial Standing:** CEX total assets, CEX VIP levels.
- **Social Influence:** Follower counts on TikTok, Facebook, Instagram, and Twitch; Instagram "Bluetick" verification.
- **Digital Presence:** YouTube subscriber count, GitHub stars.
- **Membership & Subscriptions:** Premium memberships for Telegram, ChatGPT, Gemini, Grok, Perplexity, Claude, PS Plus, Xbox Game Pass, Nintendo Switch Online, Spotify, YouTube, Apple Music, Netflix, and Amazon Prime; Steam game ownership count.

## Ecosystem Validator

This validator is designed to reward user participation within the T-Rex ecosystem itself. It facilitates the creation of badges for:

- **Early Bird Badges:** Rewards for early adopters.
- **Event Badges:** Recognizes participation in specific events, such as the "Asia Tour."
- **Student Identity Verification:** Allows for the verification of student status for educational incentives.
- **Eligible Validators:** Customizable validators for tasks like determining multi-stage NFT minting eligibility.

## Social Validator

This system supports a range of Web2 social media interactions, from simply linking a social account to a T-Rex Passport to tracking specific behaviors like follows and posts, providing a holistic view of a user's social footprint.

### 2.3 Ecosystem Points

Ecosystem Points are a centrally stored asset within the T-Rex Passport. They are designed to be a direct reflection of a user's engagement and activity within the ecosystem.

- Each badge minted has a corresponding point value.
- Different social tasks also have specific point values.
- This comprehensive user point and task system provides a dynamic metric for user activity, engagement, and contribution, serving as a secondary asset class within the T-Rex Passport.

## 3. Open Ecosystem

The T-Rex ecosystem is designed to be open and interoperable, with a focus on empowering DApp developers and projects.

- **Smart Contracts:** Our relevant contracts will be made public and verified, allowing for full transparency and audibility.

Contract	Mainnet Address	Testnet Address
T-REX Passport	0xbbB216C52f5B9095391f 463AdC438d65a8aC2242	0x06fAb5a4e177fefE5Cc1 5dc41C64Ba933021418a
T-Rex Badge	0x6F52cCCfAb0712Db45C 31863B262e2683097bb5c	t0xa51B53Dc3aA7f4ef5fE 9bb429521a73f411ad867

- **Open SDKs:** We provided comprehensive open SDKs to facilitate rapid integration.
  - **T-Rex Passport SDK:** Allows developers to easily integrate T-Rex Passport into their applications, enabling DID login and identity management.
  - **T-Rex Badge SDK:** Provides tools for DApp developers to create their own custom badge systems, allowing them to better understand and segment their user base based on verifiable credentials and behaviors.

## 4. The Economic Symbiosis Engine: Unlocking a New Web3 Paradigm

The T-Rex Passport, a living digital identity, is composed of a vast, multi-dimensional dataset including on-chain badges and off-chain points. This data represents a user's unique journey and interactions across the web. The **T-Rex Economic Symbiosis Engine**, a sophisticated backend system, is designed to transform this raw data into actionable insights, creating a powerful **User Data Magic** experience that benefits both users and projects.

### The Technical Foundation: Big Data, AI, and BI

Our economic symbiosis engine is built on a robust technical stack that integrates three key components:

- **Big Data:** We process and store a massive volume of user behavioral data,

encompassing on-chain activities (transaction history, asset holdings, dApp interactions) and off-chain proofs (Web2 social and membership data from ZKTLs validators). This data lake provides a comprehensive view of a user's digital footprint.

- **Artificial Intelligence (AI):** Machine learning models are the core of our engine. They analyze the collected data to build a detailed and dynamic **user persona graph**. This graph goes beyond simple data points, identifying patterns, interests, and potential future behaviors. For example, a model might predict a user's interest in a new GameFi launch based on their NFT holdings, Steam game library, and activity in similar protocols.
- **Business Intelligence (BI):** The AI-generated insights are then presented through a Business Intelligence layer. DApps and projects can access a user-friendly dashboard to define their ideal user profile using a simple query language. For example, a project could search for "users with high DeFi activity AND a CEX VIP Level > 3 AND a 'Social Validator' badge for Twitch followers > 10,000." This BI layer translates complex data into simple, actionable strategies.

## Technical Architecture of the Engine

The Economic Symbiosis Engine is architected as a microservices-based, event-driven system to ensure scalability, flexibility, and real-time processing of user data.

1. **Data Ingestion Layer:** This layer is responsible for collecting data from various sources:
  - **On-Chain Listeners:** Real-time listeners monitor T-Rex Passport and Badge contracts for new mints, updates, and on-chain interactions.
  - **Off-Chain API Gateways:** Secure, private gateways receive data from our ZKTLs and Social Validators.
  - **Batch Processors:** Historical on-chain data is periodically ingested to build initial user profiles.
2. **Data Processing Pipeline:** Once ingested, data flows through a pipeline of services for

cleaning, normalization, and transformation into a unified format. This pipeline is built using a pub/sub model to handle high throughput and ensure data integrity.

3. **User Persona Graph Service:** This is the core of our AI component. It's a graph database that stores the user personas, their relationships to different badges, and the associated data points. Our AI models continuously update this graph based on new data and behavioral patterns.
4. **Matching & Ranking Service:** This service executes the **Persona Matching Score (PMS)** algorithm. It takes a project's criteria as input, queries the User Persona Graph Service, and returns a ranked list of users based on their computed PMS. This service is optimized for low-latency queries to support real-time marketing applications.
5. **BI & Analytics Layer:** A set of APIs and dashboards that allow projects to interact with the Matching & Ranking Service and visualize user data. This layer provides tools for cohort analysis, A/B testing, and campaign performance tracking.

## The Dual-Benefit Ecosystem: A New Economic Model

The T-Rex Economic Symbiosis Engine creates a symbiotic relationship, fostering a two-way benefit model that fundamentally changes economic efficiency in Web3.

For the User:

The engine acts as a self-discovery tool. By interacting with the T-Rex ecosystem, users accumulate badges and points that paint a complete, verifiable picture of their digital self. They can use the T-Rex Passport as a personal BI dashboard to understand their own history, asset composition, and contributions. Instead of passively waiting for opportunities, they are proactively matched with projects and communities that align with their interests, skills, and values.

For the Project:

Projects can move beyond broad, expensive, and inefficient marketing campaigns. The engine allows for precision targeting, enabling them to find and engage with their most valuable users at a fraction of the cost. The data-driven insights eliminate guesswork,

ensuring that every marketing dollar and community effort is spent on users who are most likely to be genuinely interested and become long-term contributors. This creates a highly efficient, high-conversion marketing channel.

## The Algorithm: A Simple Look

At the core of the Economic Symbiosis Engine is a **Persona Matching Score (PMS)**, a metric that quantifies the alignment between a user's persona and a project's target profile. The formula is:

$$PMS = \sum_{i=1}^n w_i \cdot V(C_i)$$

Where:

- n is the number of defined criteria by the project.
- $w_i$  is the weight assigned to each criterion i (e.g., a project might weigh "DeFi activity" more than "Twitch followers").
- $V(C_i)$  is a value function that evaluates a user's data against criterion i. This function can be a simple binary (0 or 1), a scaled value (0–100), or a logarithmic function for non-linear data like follower counts.

The engine then returns a list of T-Rex Passport holders ranked by their PMS, enabling projects to conduct highly precise, on-chain marketing and engagement. This innovative system breaks the traditional marketing "impossible trinity," proving that efficiency, precision, and user value can all be achieved simultaneously.