

Technical Overview

About Axlflops

Axlflops is a Decentralized Physical Infrastructure Network (DePIN) that aims to democratize AI computing by creating a network where anyone can contribute and access computing resources. It uses blockchain technology for transparency, security, and to incentivize network participation through tokenization. Axlflops is built on the Solana blockchain.

Axlflops aims to provide a high-quality infrastructure for AI computing, utilizing a decentralized network to mitigate the limitations of centralized systems such as computing bottlenecks, limited collaboration, and concentrated power. The network allows for better utilization of AI computing resources while lowering costs for users.

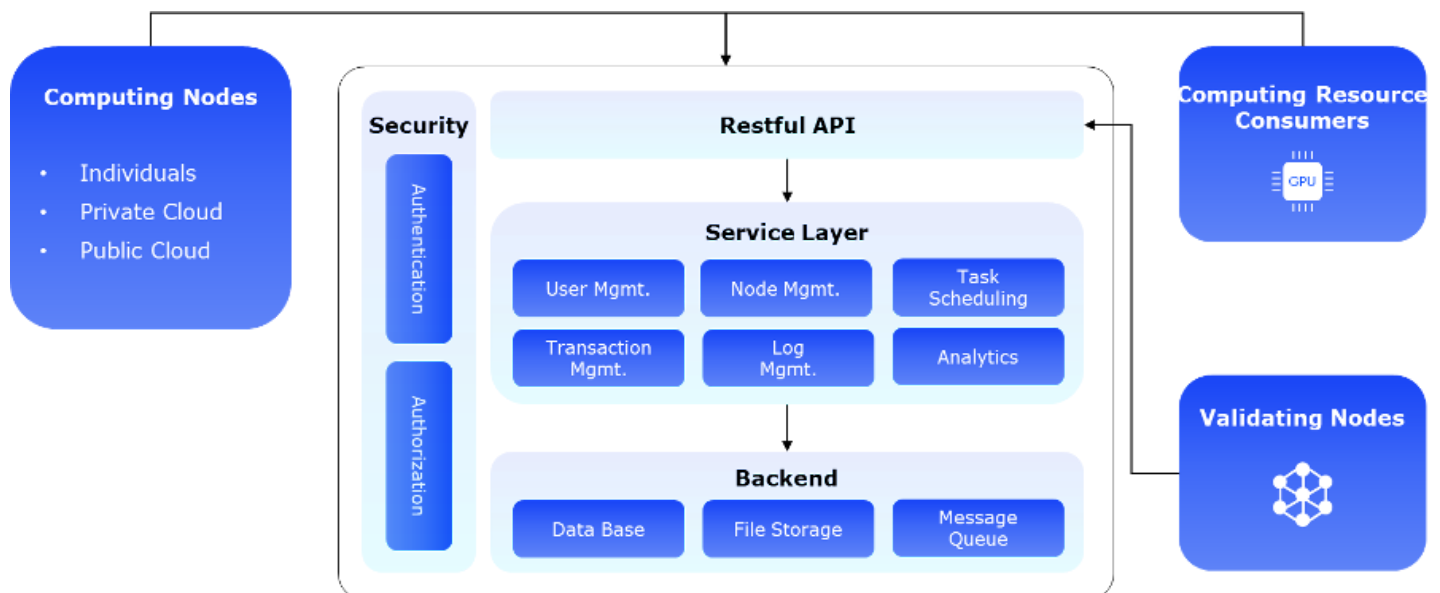
By using DePIN, Axlflops aims to leverage a distributed and decentralized physical infrastructure to serve demand from existing, non-speculative sources. Axlflops seeks to provide a solution that is more affordable and more accessible by leveraging a network of GPUs that might otherwise be idle. The system utilizes a task-grabbing scheme that gives priority to dispatch tasks to the same computing capacity provider within the same region.

Key technical aspects of Axlflops include:

- **Decentralized Resource Pool:** Axlflops utilizes a decentralized GPU pooling system that is open to anyone who wants to participate. This allows any device with a GPU to contribute its computing power.
- **Broad Compatibility:** The network supports most commonly used GPUs and other types of AI accelerators, allowing a wide range of devices to participate.
- **Supply-Demand Matching:** Axlflops optimizes the allocation of computing resources by matching user demands with available capacity through an algorithmic solution. The algorithm uses a task-staggering approach to schedule computing tasks with available resources and continuously monitors for more cost-efficient options. Axlflops' matching algorithm gives priority to providers in the same region as the GPU consumer.
- **Multiple Modes:** Axlflops offers different modes of access, including Instance Mode, which gives users more control over the environment, and Serverless Mode, which allows users to focus on their applications while Axlflops manages the infrastructure.

Axlflops Architecture

The architecture of Axlflops is a multitier, cohesive structure designed to deliver a streamlined, secure and efficient user experience. Each tier possesses distinct responsibilities and collaborates closely with each other to guarantee optimal system performance. Additionally, this architecture leverages modern, widely adopted technologies to guarantee high availability.



RESTful API

The RESTful API tier serves as the main interface for external communication, allowing consumers and nodes to interact with the Axlflops Network. Through this API, consumers can request resources, and nodes can onboard and manage their resources. It exposes endpoints for various actions like resource provisioning, usage monitoring, and task management.

Service Tier

The Service tier consists of core service modules managing the functionalities of Axlflops:

User Management: Handles user registration, profile management, and user-related configurations.

Node Management: Manages the provisioning, monitoring, and status updates of computing nodes.

Task Scheduling: Schedules and orchestrates tasks across the distributed resources, balancing loads and optimizing resource utilization.

Transaction Management: Handles payment and credit allocation between resource providers and consumers, tracking usage and billing.

Log Management: Collects and organizes logs from various components, enabling monitoring and troubleshooting.

Analytics: Provides analytics and insights on resource usage, performance metrics, and user patterns.

Backend

Database: Stores user, node, and transaction data securely and allows efficient querying for fast response times.

File Storage: Stores files and datasets that may be required by tasks running on the nodes.

Message Queue: Manages asynchronous communication between services, helping to decouple and scale various parts of the architecture.

Security

The security module ensures that only authorized users and nodes can access and utilize the resources on the Axlflops Network. Authentication verifies the identity of users and nodes, while authorization manages access control based on user roles and permissions.

Computing Nodes

These are the computing resource providers in the Axlflops Network, which can be owned by individual users, private clouds, or public clouds. These nodes contribute their computing resources to the network for consumption.

Computing Resource Consumers

These are the consumers that utilize the computing resources provided by the computing nodes. Through the RESTful API, consumers can request computing resources, perform computations, and retrieve results.

Validating Nodes

The validating nodes ensure the integrity and reliability of the Axlflops Network by validating computing nodes' availability status and computing task execution results as part of a decentralized validation process.

Instance Mode and Serverless Mode

Axlflops offers two primary modes of operation: Instance Mode and Serverless Mode. These modes cater to different user needs and preferences, providing flexibility in how users interact with the AI computing infrastructure. Instance Mode offers greater control and customization, while Serverless Mode offers ease of use and lets users focus on their applications, making the platform more versatile and accessible.

Here's a breakdown of the key differences:

- **Instance Mode:**
 - Provides users with more control over their computing environment.
 - Users have control over the operating system, middleware, container, and all other underlying dependencies.
 - This mode is suitable for users who need a high degree of customization and control over their environment.
- **Serverless Mode:**
 - Offers ease of use by allowing users to focus on their applications.
 - Axlflops handles the underlying infrastructure and undifferentiated heavy lifting.
 - This mode is designed for users who prefer a more managed and streamlined experience.
 - In Serverless Mode, users can access their AI API endpoints and integrate with their own AI Agents or other applications.