Rynus Whitepaper

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Abstract

We are in an era where technological innovations are reshaping how we create, interact, and monetize, with the rise of Artificial Intelligence and new forms of creativity. AI and Cloud Computing have evolved rapidly with clear potential, they can completely redefine our future.

We firmly believe that this transformative power should be equitably distributed; that its benefits accrue to the many, not the few; and that its secrets are unlocked for the benefit of all humanity. We envision a future where tremendous computational resources are **decentralized, democratized, and truly accessible to everyone**, so that every voice of intelligence and creativity, no matter how small, is heard.

Although GPUs are now more diverse and accessible than ever before, their full potential often remains untapped. A significant number of GPUs, owned by both businesses and individuals, are underutilized. High-capacity GPUs are used for

simple tasks or those requiring less computational power. Moreover, these resources often remain idle during off-peak times. Even professional centralized services such as render farms or GPU clouds typically operate at around 80% of their capacity. The average rate of server utilization in data centers is only [12-18% of capacity](). This imbalance between supply and demand of computational resources leads to significant inefficiencies in the technology sector.

To address this issue, it is crucial to allocate computational resources more reasonably, appropriately, and effectively on a global scale. Rynus serves as the platform that connects all idle GPUs worldwide with those who truly need them, thereby addressing the asymmetry in GPU supply and demand, and fostering a genuinely powerful resource for technological breakthroughs.

Introduction

Rynus is a decentralized GPU cloud computing platform based on blockchain for AI and 3D rendering. Our mission is clear: to democratize access to cloud computing power and address the inherent imbalance between the supply and demand of computational resources in the market.

At its core, Rynus is a platform designed to accommodate a diverse range of computational tasks, from 3D rendering to training AI, Machine learning, and Deep learning models. These tasks are fast and efficiently executed within a blockchain-based peer-to-peer network, free from errors or delays, while ensuring data security and privacy.

Our vision extends beyond the realms of AI and 3D rendering. We envision a future where additional services, such as NAS and mobile devices, are integrated into our platform. This expansion will enable us to provide even more comprehensive and versatile cloud computing services, meeting a broader range of user needs and advancing the frontiers of technological innovation.

Problem and Solution

Problem

Supply and Demand Mismatch in Computing Power

We find ourselves on the cusp of an incredible technological era, characterized by constant changes driven by revolutions in Artificial Intelligence, Augmented and Virtual Reality, 3D Rendering, the Metaverse, and more. These technological innovations are rapidly reshaping our world, creating a future unlike anything we have seen before. At the heart of these transformations lies computing power, which is the core energy in the digital age.

Despite its importance, one main problem exists - **supply and demand mismatch in computing power**.

The race to technological revolutions, especially to AI, has created a thirst in demand for computing power so insatiable. The demand for AI chips is soaring with tech giants like Microsoft, Meta, Amazon, and Alphabet racing to build data centers to make generative AI services such as ChatGPT, Runway AI, and Gemini a reality. Additionally, numerous original equipment manufacturers, original design manufacturers, and a long list of customers in biology, health care, finance, AI development, and robotics industries are also clamoring for GPUs. From big techs to small startups to individuals, everyone is scrambling to secure enough GPUs.

On the other hand, the GPU supply is currently limited. Even NVIDIA, the leading GPU manufacturer in the [estimated USD 65.27 Billion GPU market](), is also facing supply constraints that [CEO Jensen Huang had to discuss]() how 'fairly' they decide who can buy their GPU chips.

Underutilization of GPU Resources

Despite the mismatch in supply and demand, an important challenge is that GPUs are not being used to their full potential.

The majority of GPUs are concentrated in centralized providers. Typically, only 50% to 70% of their computing resources are actually utilized, leaving 30% to 50% constantly underutilized. Despite this unused capacity, there is always demand for it elsewhere. However, the high costs associated with these centralized models have created barriers for many users to access cloud computing services, preventing them from taking advantage of these computing resources.

Furthermore, there are hundreds of millions of GPUs that have been sold to tech companies, enterprises, data centers, cryptocurrency mining companies, studios, and individuals, and are also sitting underutilized. Due to declining block rewards, GPUs purchased for cryptocurrency mining have become inefficient. Individuals or studios typically do not utilize their own computing resources throughout the day. Nevertheless, people worldwide still need to buy new devices to meet their computing needs.

This situation represents a significant paradox where available GPU computing potential is abundant, yet it remains largely untapped. Opening up access to these resources will be enough to significantly impact GPU resource supply.

High Cost

A few big corporations/companies mainly control the current centralized GPU cloud computing models. This has resulted in a market with limited competition and high service costs. The concentration of power in the hands of these corporations/companies has led to inflated pricing structures, which makes it difficult for smaller users to access cloud services.

Limited Selection and Flexibility

The limited selection and inflexibility of GPU brands and models available in centralized GPU cloud computing platforms is another significant issue. The majority of these platforms primarily support NVIDIA GPUs, neglecting the increasing training/rendering performance capabilities of AMD GPUs.

This lack of support for AMD GPUs is noteworthy, considering its significant presence in the industry. Additionally, these platforms are constrained to standardized configurations, making it difficult for them to accommodate specialized accelerators or emerging new GPUs that are optimal for cutting-edge 3D rendering and AI pipelines.

Technical and Performance Limitations

Centralized GPU cloud computing models present several issues that can impact performance for graphics workloads like 3D rendering and AI training. Concentrated GPU resources within large data centers introduce network latency when transferring data between remote GPU clusters and client applications. For real-time workflows relying on iterative access, this lag is problematic.

Another main issue with centralized GPU cloud computing models is data security. Storing and processing significant amounts of data in large data centers creates a single point of failure or attack surface. When all customer data and workloads are consolidated in one location under the control of a single entity, it becomes an attractive target for hackers and nation-state actors. The data, especially in creative fields like rendering or AI training, is highly sensitive and requires proper protection.

Solution

Rynus aims to address all the issues with centralized GPU cloud computing models. We connect those who require GPU computational power for 3D rendering and AI training with those who have available GPU power. This connection creates a decentralized and democratic space where anyone can access the massive GPU power and complete even the smallest creative jobs. Rynus helps to harness unused GPU cycles all over the world and reshape a new level of media generation.

Democratizing Computing Power and Solving Supply-Demand Mismatch

We believe it is crucial to distribute the tremendous power of computing widely and ensure that everyone benefits from it, not just a select few. To achieve this, we aim to decentralize and democratize our immense computing power, making it truly accessible to everyone. We want every voice of intelligence, no matter how small, to be heard and for the secrets of technology to be unlocked for the benefit of all humanity.

Rynus democratizes computing power and radically solves the problem of supply and demand mismatch worldwide. Rynus is a decentralized cloud computing network, giving everyone access to abundant cloud computing power. We connect global computing resources, matching supply and demand at the right time to ensure that all computing resources are fully utilized and not wasted.

RYNUS allows all disadvantaged groups to take advantage of cheap cloud computing power from a decentralized model. We create a greener computing world, reducing environmental pollution by utilizing all computing power to the maximum extent. A more diverse world will be reshaped because, with Rynus, everyone's creative ideas and design styles have access to diverse and affordable cloud computing power.

The nature of Rynus is decentralized cloud computing. We take the first step in the field of 3D rendering and AI training and solve all existing core problems by providing:

More Affordable and Transparency

Rynus's decentralized GPU computing on blockchain model addresses the inequities of centralized cloud monopolies by creating a truly open and competitive marketplace. Individuals globally can contribute unused GPU resources, fostering vastly more competition than the current duopoly.

With thousands of peer-to-peer nodes worldwide, no single entity can dictate pricing. This model benefits both underserved customers and independent suppliers by lowering barriers to participate affordably. Workloads also gain the flexibility to leverage the most competitive resources dynamically, and distributed ledgers promote transparency. By leveraging blockchain technology, Rynus dismantles centralized control over pricing, establishing an equitable system that encourages innovation and inclusion.

Diverse Selection and Flexibility

Rynus aims to address the current limitations and lack of flexibility in accessing GPU resources within centralized GPU cloud models. Unlike centralized models, our platform supports a wide range of GPU manufacturers, including NVIDIA, AMD, Apple, and Intel.

By creating an open and decentralized marketplace for graphics hardware, we allow individuals and entities to contribute their hardware resources to a decentralized cloud ecosystem. This provides users with the flexibility to choose from various GPU manufacturers and models, driving innovation in rendering and deep learning through specialized computing power that is not available in traditional centralized platforms.

Furthermore, we are actively working on the development of a dedicated multi-GPU rendering engine that will support NVIDIA and AMD GPUs for 3D rendering. As part of our plans, we intend to create an enhancement plugin for TensorFlow that will support both AMD and NVIDIA, further expanding the capabilities of our platform.

Reduced Latency and Improved Security

By distributing GPU resources across many independent nodes worldwide, workloads can be routed to hardware placed closer to end users, avoiding long-distance data transfers over centralized cloud networks. This significantly

reduces latency. Based on blockchain technology, Rynus maintains users' full ownership and control over their data, models, and intellectual property.

Democratizing Access to Unlimited GPU Resources for Mutual Gain

Rynus is a game-changer in the field of cloud computing. We address the issue of underutilization of GPU resources and provide a solution that benefits everyone involved.

The decentralized nature of our platform allows users to contribute their own GPU resources to the system, which can be used by others in need of additional resources. This not only helps to reduce the gap between supply and demand, but it also provides an opportunity for those with free GPU resources to monetize by contributing their resources to the system.

3D rendering and AI training users can access unlimited GPU computing resources that are abundant and difficult to access on any platform to serve the most complex and large-scale rendering and model training tasks.

Establishing a Democratic, Fair, and Free Cloud Computing Market

GPU/CPU providers (Workers) participating in the Rynus network will **bid** for computing jobs. Unlike other cloud computing services where the service provider or the platform sets the prices, the rental cost of GPU/CPU for a computing job on Rynus is **determined by the Workers themselves**.

This pricing is influenced by supply and demand dynamics within the cloud computing market at that particular time. As a result, the cost fluctuates based on real-time market conditions, ensuring a more equitable and transparent pricing model. This approach empowers Workers to have control over their pricing, fostering a decentralized ecosystem where market forces dictate prices. By doing so, Rynus promotes a cloud computing market that is not only more democratic and fair but also offers greater freedom, aligning with the principles of a decentralized and user-driven network.

Green Initiatives, Carbon Reduction, and Environmental Sustainability

Rynus is a decentralized GPU cloud computing platform built on blockchain technology, committed to promoting environmental sustainability and reducing carbon emissions. By leveraging a **green blockchain**, Rynus ensures that the energy used by its network is directed toward providing valuable computing power, avoiding the wasteful energy consumption typical of traditional proof-of-work (PoW) blockchains. This is achieved through its innovative proof-of-compute consensus algorithm, which focuses on the completion of computing jobs.

Two key ways Rynus reduces carbon emissions:

1. Efficient use of underutilized GPU resources.

Rynus connects underutilized GPUs globally, maximizing their use for processing computing jobs. This approach not only alleviates the shortage of computational resources but also reduces the need for new hardware production. By utilizing existing resources more effectively, Rynus significantly cuts down on the energy required for manufacturing new GPUs and other hardware.

2. Reduction in the need for new hardware manufacturing.

Rynus's strategy of not building new data centers or purchasing new hardware results in substantial environmental benefits. This includes reducing carbon emissions during the manufacturing process and minimizing electronic waste.

Moreover, centralized data centers are known for their high energy consumption and significant carbon footprint. Rynus's decentralized model addresses these concerns by distributing computational tasks across individual and idle GPUs. This **reduces the reliance on large data centers**, leading to lower overall energy consumption and a reduced environmental impact.

How Rynus Works?

Rynus Model
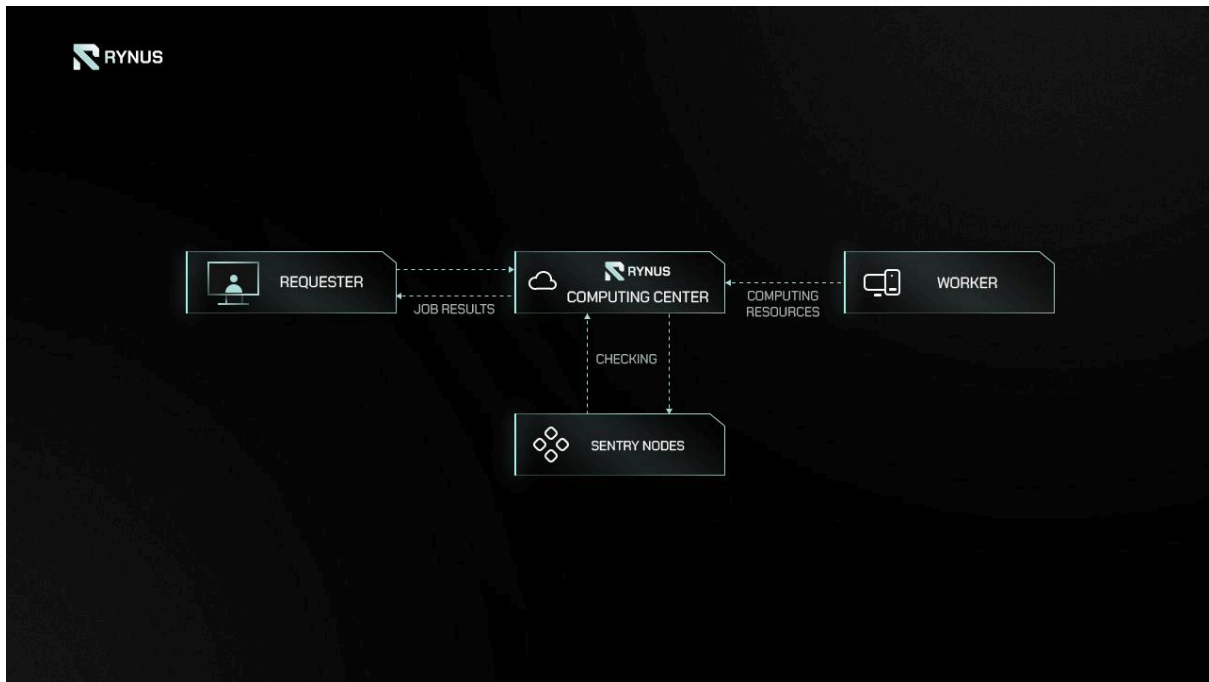
The Rynus model encompasses four key entities:

Requester

Requesters are individuals or entities limited by the computing power at their disposal, thus requiring substantial power for AI model training, Data labeling, or 3D rendering.
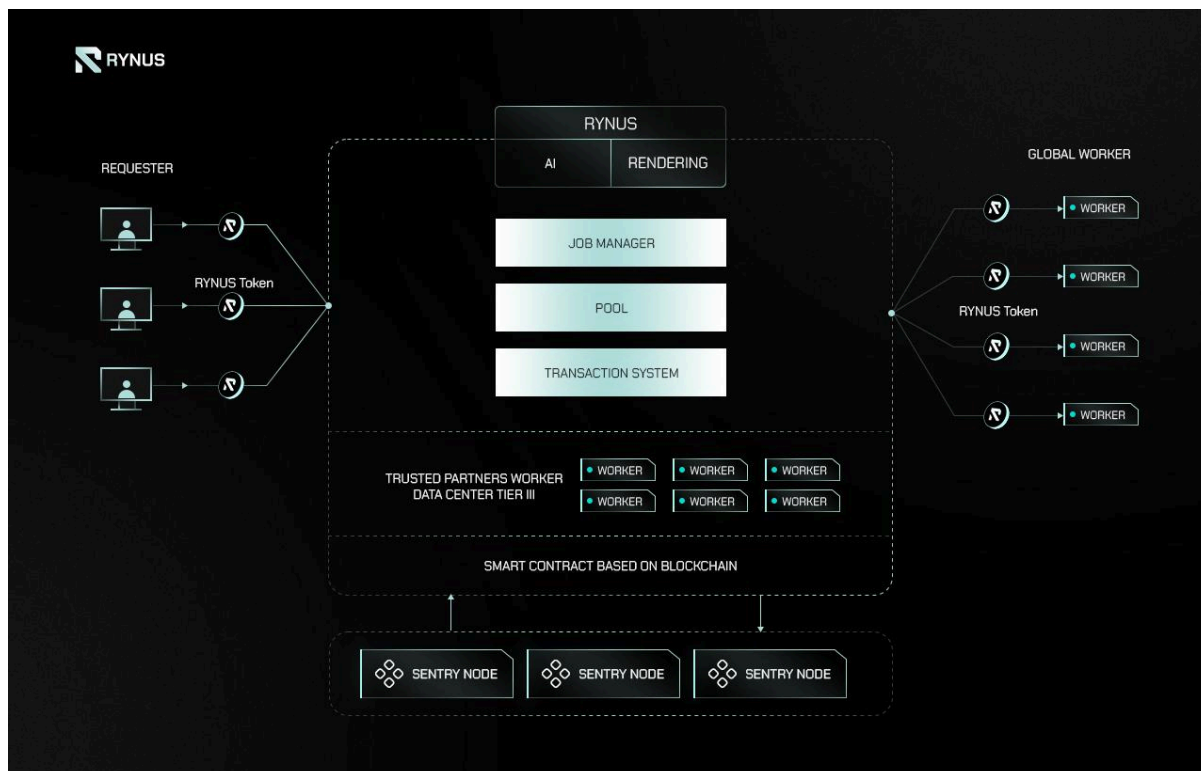
Worker

Workers are GPU nodes contributing computational power to the Rynus network. Workers include both Trusted Partners Workers, situated within our local data center, and Global Workers, GPU nodes seeking to join the network.

For Data labeling jobs, Workers can be any device, from PC, laptop to iPad and mobile.

Sentry Node

Sentry Nodes are nodes that are responsible for regularly checking resource availability and evaluating the performance of Workers, ensuring the integrity, performance, and quality of service within the network.

Rynus

Rynus is a blockchain-based GPU cloud computing platform that connects Requesters, Workers, and Sentry Nodes. Within the Rynus infrastructure, the following components play crucial roles:

- **Job Manager**

The Job Manager is responsible for resource allocation and coordination of Workers worldwide, including hardware checks and standardization control tasks. Rynus has amassed five years' worth of standardized data to address these tasks efficiently as well as developed AI bots to optimize task allocation for the best performance. The Job Manager efficiently handles tasks by constructing queues, segmenting jobs into smaller tasks, and distributing them to Workers.

- **Pool**

The Pool manages the online, offline, busy, available, and unavailable status of Workers, ensuring efficient utilization and availability of computational resources.

- **Transaction Manager**

Transaction Manager handles payments through the Rynus token and smart contracts that are based on blockchain technology. Additionally, Requesters have the option to make payments in fiat currency.

Rynus Products

Rynus provides four main products:

Rynus Cloud

Rynus Cloud serves as the central platform where Requesters can access to create AI training, Data labeling, and 3D rendering jobs, and Workers can access to manage their resources.

Rynus Transfer

Rynus Transfer is an application that helps quickly and efficiently transfer computing job data between Requesters and Rynus platform.
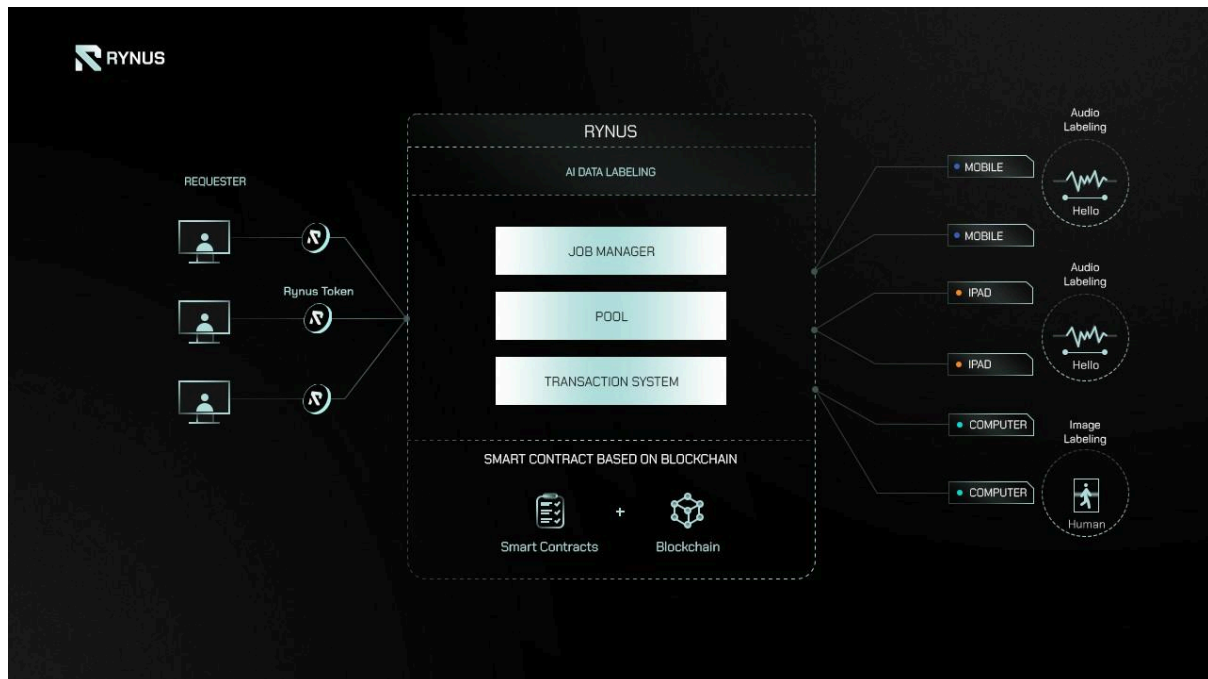
Rynus Worker

Rynus Worker is an application designed for Workers to quickly, easily, and securely contribute their idle GPU(s) to the Rynus network and earn tokens. Rynus Worker is also a mini-app for any device (PC, laptop, iPad, mobile) to perform data labeling jobs and earn RYNUS tokens.

Rynus Explorer

Rynus Explorer provides users with a comprehensive view of Rynus network, offering transparency to our GPU-powered operations.

Rynus Flow for AI Model Training

Rynus AI Training works under a SaaS model supporting all AI frameworks and libraries.

Workflow explanation:

1. The requester submits AI training jobs on Rynus using the Rynus Cloud and/or Rynus Transfer app.

2. The protocol calculates the amount of RYNUS tokens required to perform the AI training job. Details are attached to a smart contract and sent across the Rynus

3. Workers use the Rynus Worker app integrated with the required AI libraries and software to process the requested AI training job.

4. Once AI training jobs are completed and delivered, RYNUS tokens are transferred via the smart contract.

Rynus Flow for Data Labeling

Rynus Data Labeling works under a SaaS model, offering labeling services for images, text, and audio.

Workflow explanation:

1. The requester submits Data Labeling jobs on Rynus using the Rynus Cloud and/or Rynus Transfer app.

2. The protocol calculates the amount of Rynus tokens required to perform the Data Labeling job. Details are attached to a smart contract and sent across the Rynus.

3. Workers use the Rynus Mini app to label data (images, text, and audio).

4. Once Data Labeling jobs are completed and delivered, Rynus tokens are transferred via the smart contract.

Rynus Flow for 3D Rendering
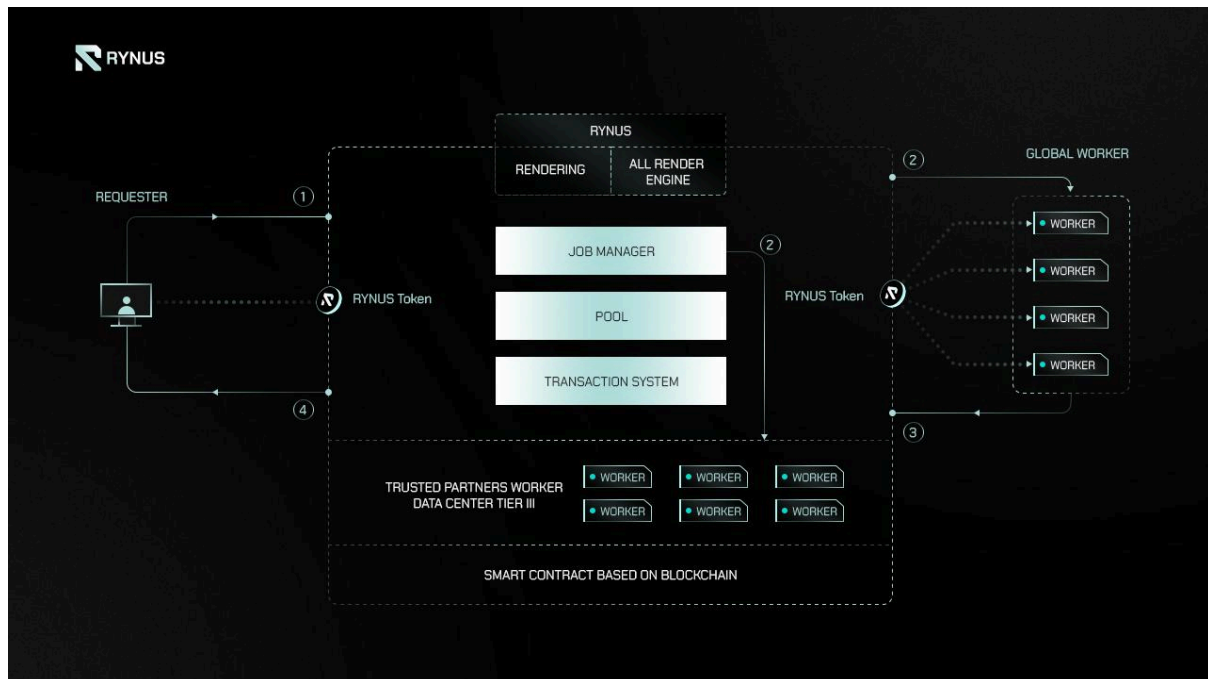
Rynus 3D Rendering works under a SaaS model for Blender and an IaaS model for all single GPU and multiple GPU renderers such as Redshift, OctaneRender, Arnold, V-Ray, Iray, KeyShot, RenderMan, Lumion, Unreal Engine, Twinmotion, Enscape, Chaos Vantage, etc.

Workflow explanation:

1. The requester submits rendering jobs on Rynus using the Rynus Cloud and/or Rynus Transfer app.

2. The protocol calculates the amount of RYNUS tokens required to perform the rendering job. Details are attached to a smart contract and sent across the Rynus

3. Workers use the Rynus Worker app integrated with the required render engines to process the requested rendering job.

4. Once rendering jobs are completed and delivered, RYNUS tokens are transferred via the smart contract.

Rynus Architecture

The Rynus Architecture is designed to provide a robust, scalable, and secure platform for decentralized GPU cloud computing. This architecture includes a comprehensive system architecture and its integral components, highlighting the seamless interaction between various components to deliver efficient and reliable services.
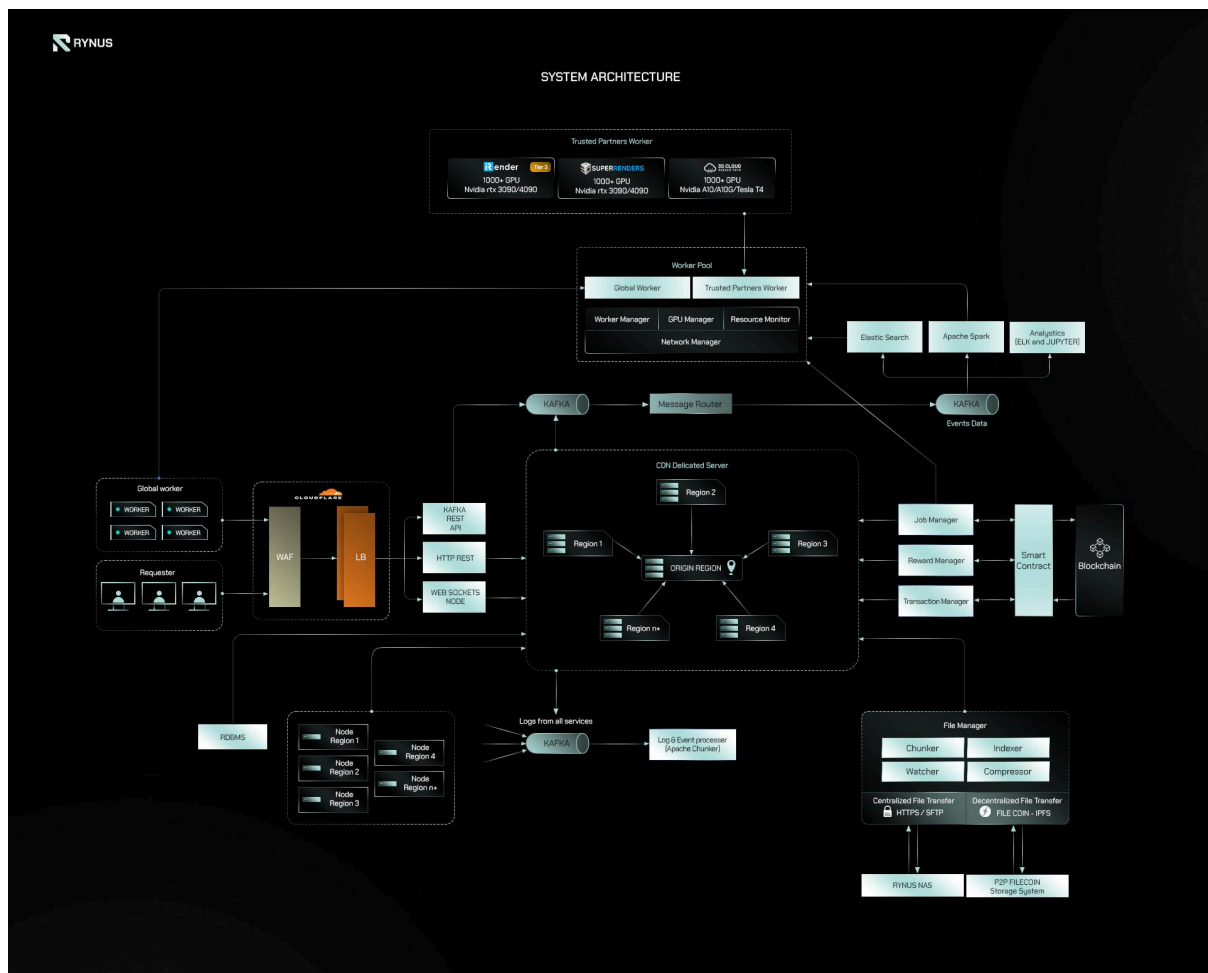
User Interface

Rynus user interface is designed with end-users in mind, offering an intuitive and user-friendly experience. This includes the Rynus Cloud, Rynus Transfer, and Rynus Worker application, all engineered for ease of use and seamless interaction.

Tech Stack:

- **Rynus Cloud:** Vue.js, Tailwind, web3.js.
- **Rynus Transfer and Worker:** WPF C#.

Security

Security is a crucial component of Rynus system to improve system safety and security. It is responsible for safeguarding against external threats as well as managing and balancing the system load.

Tech Stack:

- Cloudflare Webapp Firewall (WAF), Cloudflare Load Balancer (LB).

Worker Pool

Worker Pool is the foundational component of Rynus system, encompassing all GPU/CPU resources. It monitors, manages all Workers and GPU/CPU, and distributes computing tasks to the appropriate Workers.

Tech Stack:

- **GPU/CPU Pool.**
- **Orchestration:** Apache Airflow, Kubernetes.
- **Monitoring:** Zabbix, Grafana.
- **Data Storage:** FILECOIN p2p storage, Rynus cloud storage.
- **Containerization:** Docker.

Message Queue/Message Router

This component is responsible for coordinating information messages smoothly. It ensures the accuration and flexibility of system operation and maintain the integrity and timeliness of messages.

Tech Stack:

- **Message Queue:** Kafka.
- **Message Router:** RabbitMQ.

Database

Our primary database stores all critical system information, including user data, jobs, and worker details. It uses primary storage for structured data and cache for temporary data, employing a mix of both for optimal performance.

Tech Stack:

- **RDBMS:** Microsoft SQL Server, PostgreSQL.

- **Caching:** Redis.

Dedicated Servers

Rynus has servers strategically located across various continents to minimize latency and enhance system reliability and speed. Key locations include Northern California, Northern Virginia, São Paulo, Cape Town, Frankfurt, Mumbai, Seoul, Sydney, and Vietnam.

Tech Stack:

- Data Center Tier III.

API/WebSocket

This acts as a bridge connecting applications with the backend system. Using RESTful API and WebSocket, Rynus ensures seamless and complete data transmission from the server side to the applications of end user.

Tech Stack:

- RESTful API, FastAPI, GraphQL, Socket IO.

Elastic Search

Elastic Search facilitates the efficient search and selection of Workers best suited for each computing job. It also optimizes resource utilization and cost efficiency in selecting and using Workers to process computing job.

Tech Stack:

- Java Lucene, Apache Spark.

AI Core

The AI core is the heart of Rynus system, comprising numerous AI/ML models that provide recommendations to optimize processes in terms of time and cost. It offers suggestions for job creation, Worker selection, and job parameter optimization.

Tech Stack:

- Apache Spark, TensorFlow.

Job Manager

This component manages and monitors all computing jobs, including AI/ML model

training and 3D rendering tasks.

Tech Stack:

- Microsoft SQL Server, PostgreSQL.

Transaction/Reward Manager

Transaction/Reward Manager handles all transactions related to Rynus tokens and fiat currency, and manages rewards for Workers upon job completion.

Tech Stack:

- **Blockchain:** Smart contract, On-chain blockchain.

File Manager

File Manager is responsible for managing data of computing jobs uploaded by Requesters to the system. It manages and transfers this data to Workers to process computing jobs.

Tech Stack:

- Filecoin, SFTP.

Backend

The backend consists of various components responsible for many separate functions that ensure the system operates smoothly and reliably. This includes monitoring, logging, analytics, and autoscaling functionalities.

Tech Stack:

- Zabbix, Grafana, ELK stack, Flask, Node.js, Python.

Rynus Key Features

Decentralized Cloud GPU Computing Platform

Rynus allows individuals and entities around the world, regardless of specialized knowledge, as long as they have unused GPUs, to join and contribute GPU resources to the cloud system. Thus, we create a platform containing unlimited GPU computing resources.

We connect people who do AI training, Data labeling, and 3D rendering and require GPU computing power with individuals and entities with unused GPUs worldwide.

For AI Training, Data Labeling, and 3D Rendering

With unlimited decentralized GPU resources, Rynus is for AI Training, Data Labeling, and 3D Rendering. Rynus distributes AI Training, Data Labeling, and 3D Rendering jobs through a distributed system of GPU computers (Workers) across the world, allowing the smallest AI training, data labeling, or rendering jobs to access massive GPU resources.

Based on Solana Blockchain

Rynus integrates the Solana blockchain and provides a Proof-of-Compute system.

Those who request AI training, Data labeling, or 3D rendering jobs (called Requesters) will pay those who train AI models, label data, or render (called Workers) with Rynus Tokens. Rynus tokens are issued based on Solana blockchain technology. Solana brings transparency and security to transactions on the platform. Tokens can be stored in any Solana wallet and traded on compatible exchanges.

Rynus also uses a Proof-of-Compute system. This system saves proof of computation on the blockchain, as proof that Workers have completed training AI model, labeling data, or 3D rendering, and then awards Workers with Tokens. This system ensures that Workers' completed results meet the Requesters'

requirements.

Diversity and Affordability

The Rynus platform connects a global network of spare GPU resource providers, providing unlimited GPU resources in terms of quantity, brand, and model. It is a cloud platform, thus allowing users from around the world to access and use available GPU resources without the need to purchase costly hardware or pay for high hardware maintenance costs. It also eliminates the need to rent services from high-cost centralized GPU cloud computing platforms.

Rynus offers various price tiers, enabling users to choose a tier suitable to their ability to pay. Additionally, we provide many different GPU brands and models, enabling users to choose a GPU that fits the requirements of each rendering or AI training project.

Optimizing Monetization Opportunities

Users who have GPUs sitting idle can contribute them to Rynus's Worker system and earn Tokens. Rynus provides an app for Workers that integrates both mining and receiving 3D rendering jobs or AI training tasks from the system.

Workers can earn Tokens not only from performing rendering jobs and AI training tasks but also from mining on the app itself. This is an advantage that Workers can hardly find on other platforms. With Rynus, anyone with free GPUs around the world can optimize their monetization opportunities.
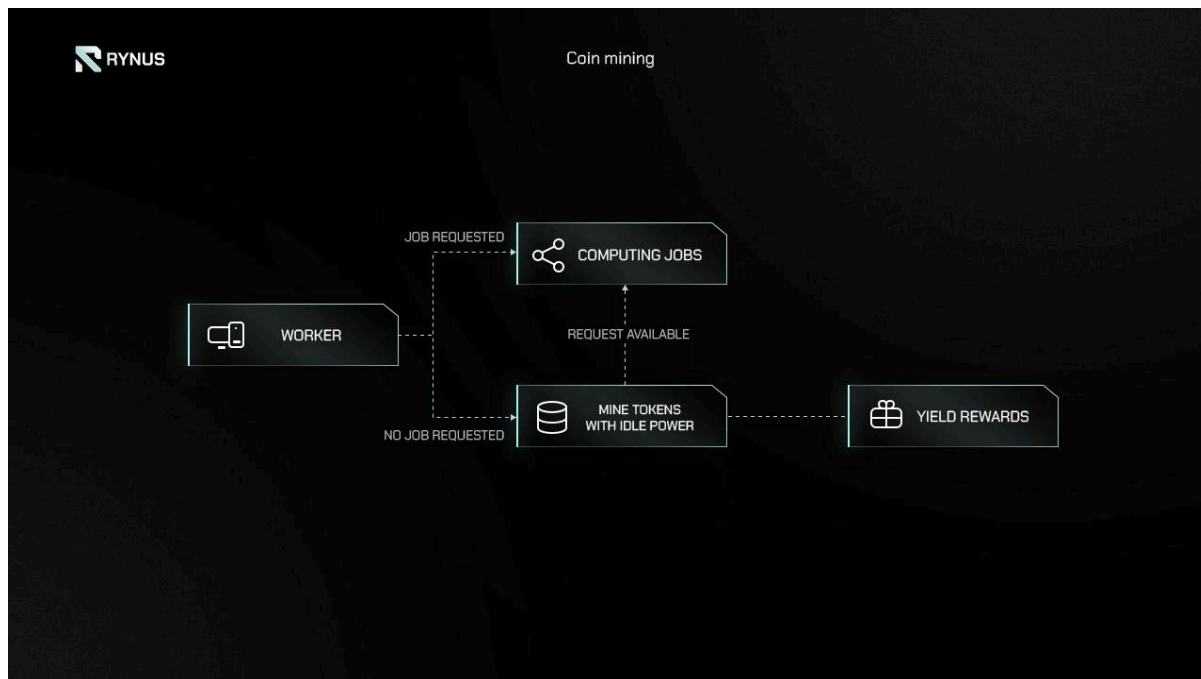
Decentralized Pricing Model

One of the key features of Rynus is its **decentralized pricing model**. In the Rynus network, GPU/CPU providers, known as Workers bid for computing jobs, setting their own prices rather than having the platform dictate them. This approach contrasts with other cloud computing services where the service provider sets the costs. The rental cost of GPU/CPU for a computing job on Rynus is determined by the Workers themselves, influenced by real-time supply and demand dynamics within the cloud computing market.

This results in cost fluctuations based on current market conditions, ensuring a more equitable and transparent pricing model. By allowing Workers to control their pricing, Rynus fosters a decentralized ecosystem where market forces dictate prices, promoting a cloud computing market that is democratic, fair, and offers greater freedom. This aligns with the principles of a decentralized and user-driven network, empowering participants and enhancing the overall fairness of the platform.

Rynus Unique Features

Rynus offers a range of unique features that distinguish us from other decentralized networks in the market.

Comprehensive Services

Rynus provides Decentralized GPU Cloud Computing for AI Training, Data Labeling, and 3D Rendering fields, combining the strengths of other competitors into a single, unified platform.

Furthermore, our vision extends beyond this. AI and 3D rendering are just the beginning. In the future, we aspire to integrate everything into our DePIN platform, such as storage, gaming, mobile, automobile, and more.
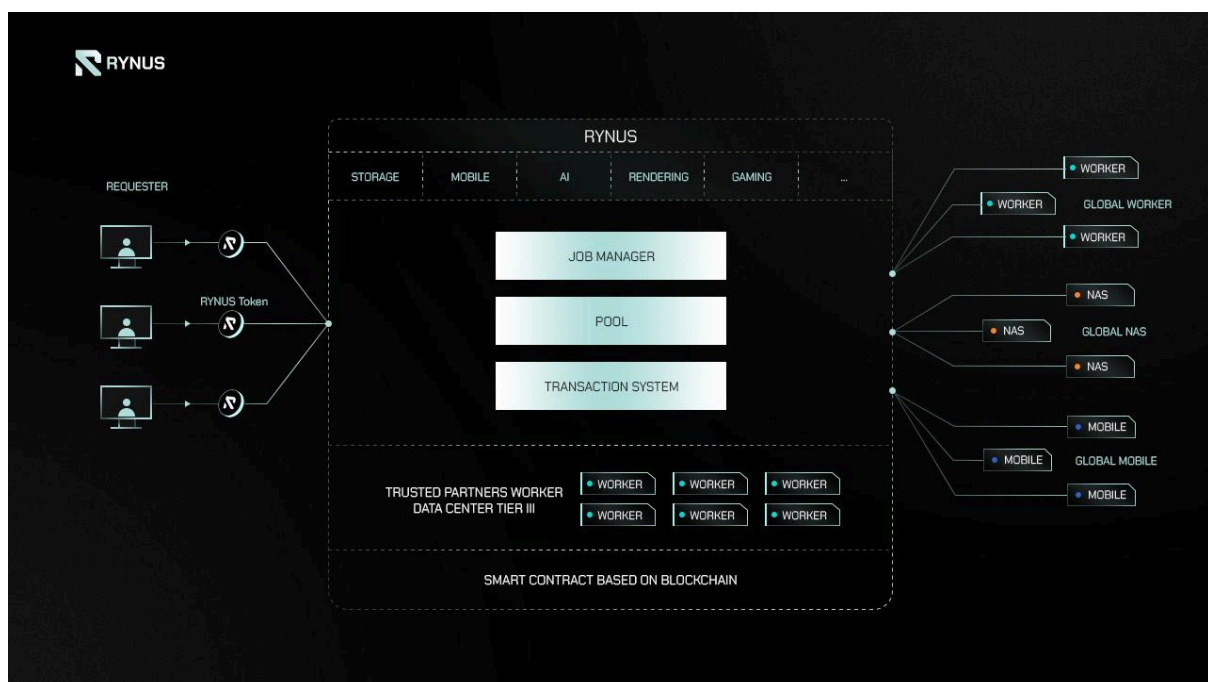
Big Data Transfer

The seamless transfer of big data poses a critical challenge for any decentralized and centralized systems. Particularly in today's landscape, big data plays an increasingly vital role in AI training and machine learning. The quantity and quality of data directly impact the learning and pattern recognition capabilities of AI

systems.

With the rapid advancement of technology, AI models have evolved significantly, resulting in minimal differences among them. In some cases, even tools like ChatGPT can assist in creating a training model. Consequently, the quality of input data is now the critical factor determining training outcomes. Training involves a model learning from data—the more data available, the more the model can learn, leading to greater accuracy. This underscores the critical importance of big data in AI. Efficient big data transfer is essential and foundational for any AI training service.

When utilizing a third-party AI training service or platform instead of training locally, an excellent data transfer tool becomes indispensable. Without the capability to transfer data effectively, neither the service/platform nor the AI model will function properly. Big data transfer is a significant concern for all cloud computing service providers, each employing various tools and protocols for file transfer.

At Rynus, we have developed our proprietary protocol with six standout features to address the complexities of big data transfer. Rynus has also introduced its own desktop app as a specialized data transfer tool, designed to offer superior performance compared to other available tools.

File Splitting

Rynus Network intelligently determines the optimal segmentation of files based on the client's network conditions. For instance, for a 1 GB file, Rynus may initially divide it into smaller, more manageable parts of 100 KB. As the client's network improves, Rynus adjusts dynamically, potentially dividing the file into larger segments, such as 300 KB.
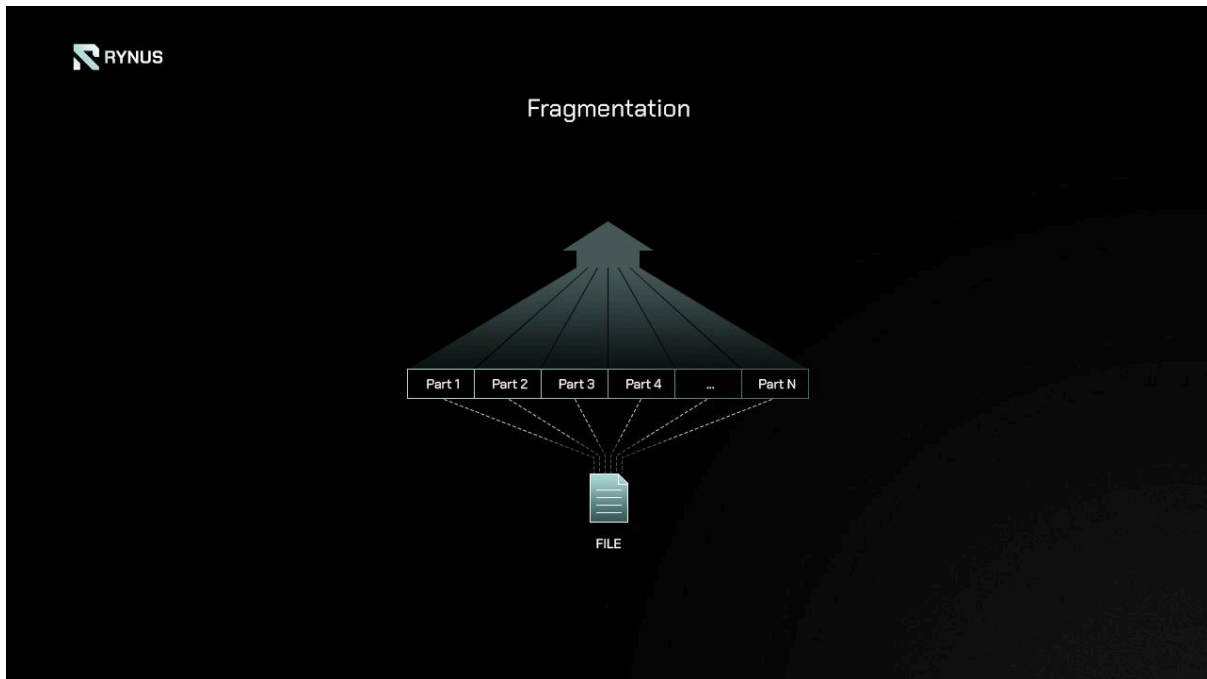
Another reason behind this feature is to maximize bandwidth usage efficiently. Whether the available bandwidth is high or low, Rynus ensures that file segments are transferred using the full bandwidth capacity.

File Compressing

Uploading a folder with 1000 files totaling 1 GB can be time-consuming compared to a single 1 GB file. Hence, Rynus employs compression techniques aligned with our standards. This process compresses the files before segmenting and transferring them, ensuring fast upload speeds.
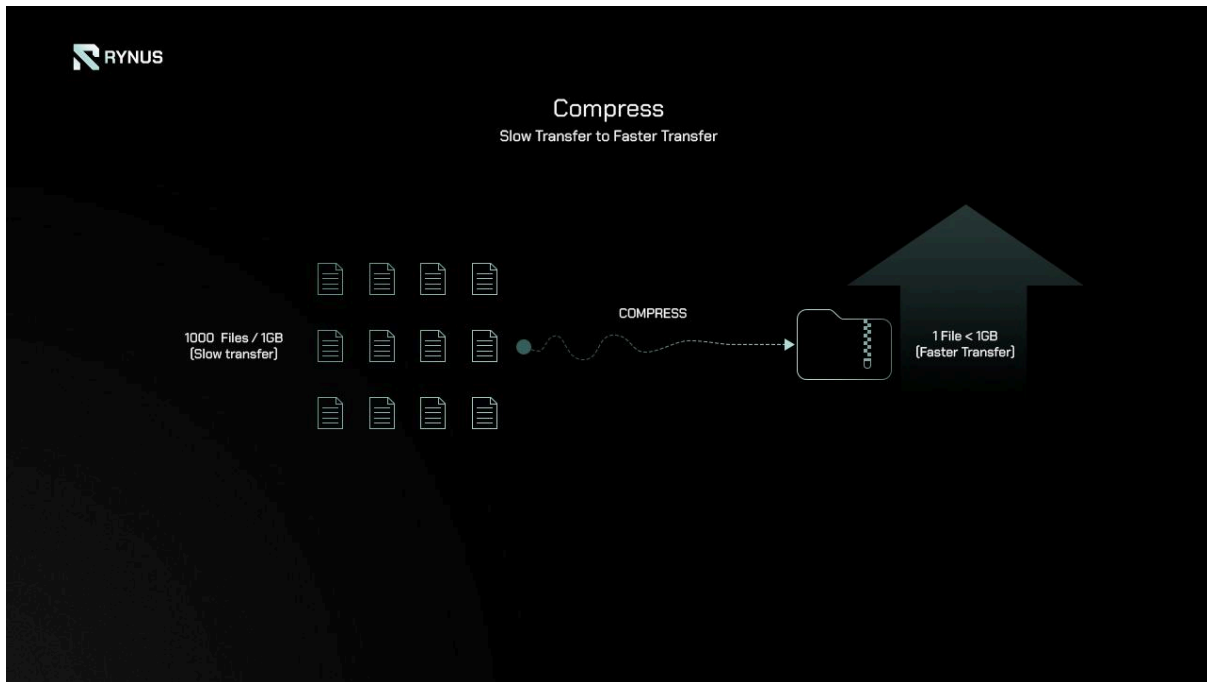
Pause/Resume Functionality

Consider a case where a client has uploaded 80% of 1 TB data but encounters a network interruption. Upon reconnection, the client does not need to restart the upload from scratch. Instead, they can seamlessly resume from the point of interruption, uploading only the remaining 20%. Additionally, users can pause and resume uploads at their convenience, facilitated by Rynus's file numbering system that tracks and manages pieces of uploaded files.
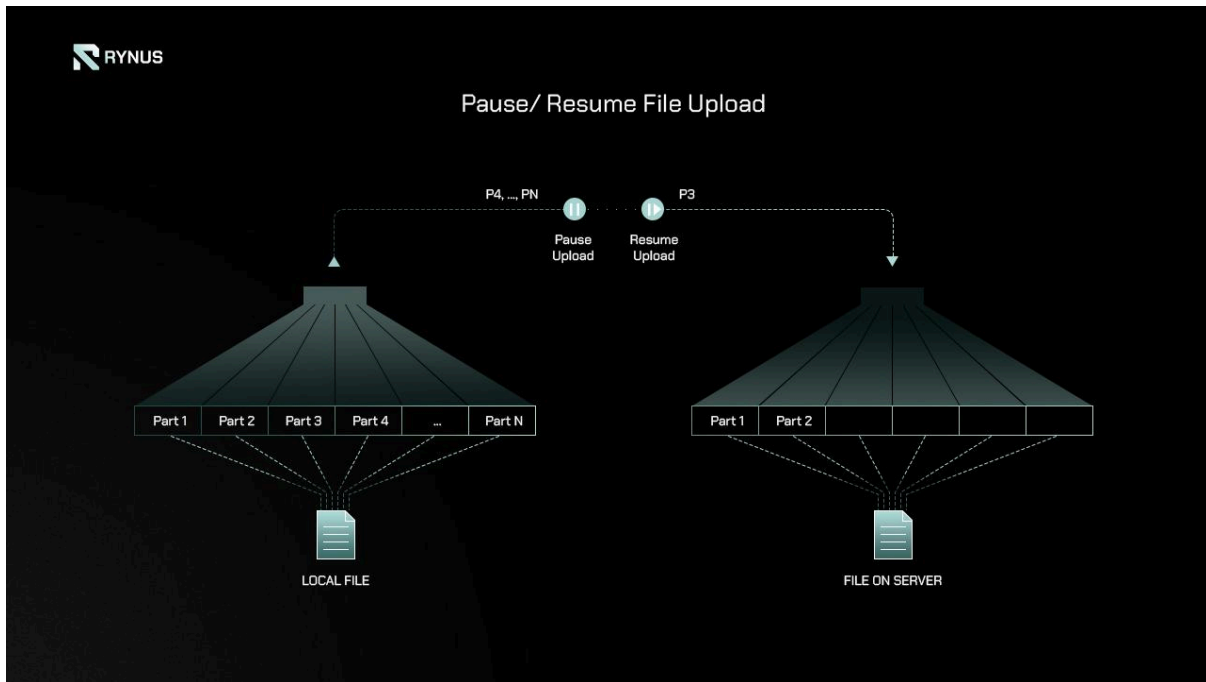
Selective File Upload

In the course of project work, modifications may be necessary. Rather than re-uploading an entire folder containing numerous files, Rynus identifies and uploads only the files that have been updated. This efficient approach avoids redundant uploads of unchanged files.

These four points allow Rynus's solution to adapt dynamically to varying network conditions and ensure efficient file transfers. Furthermore, to optimize the process and minimize time, Rynus leverages the following approach.
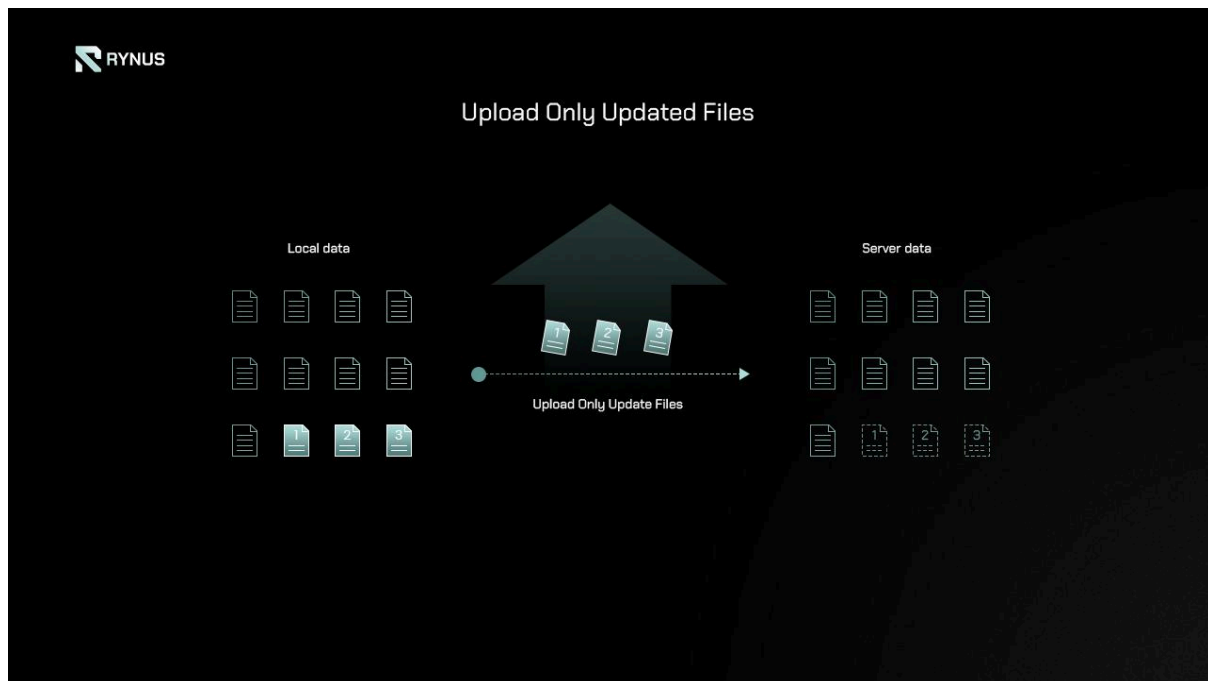
Optimal File Routes

When transferring client data, Rynus does not rely on a single path from A to B. Instead, we explore multiple routes through different network nodes. Rynus tests various routes by sending "seed files" - small, 1 KB pieces through each route. The route with the fastest response time is then selected, ensuring fast and efficient file transfers.
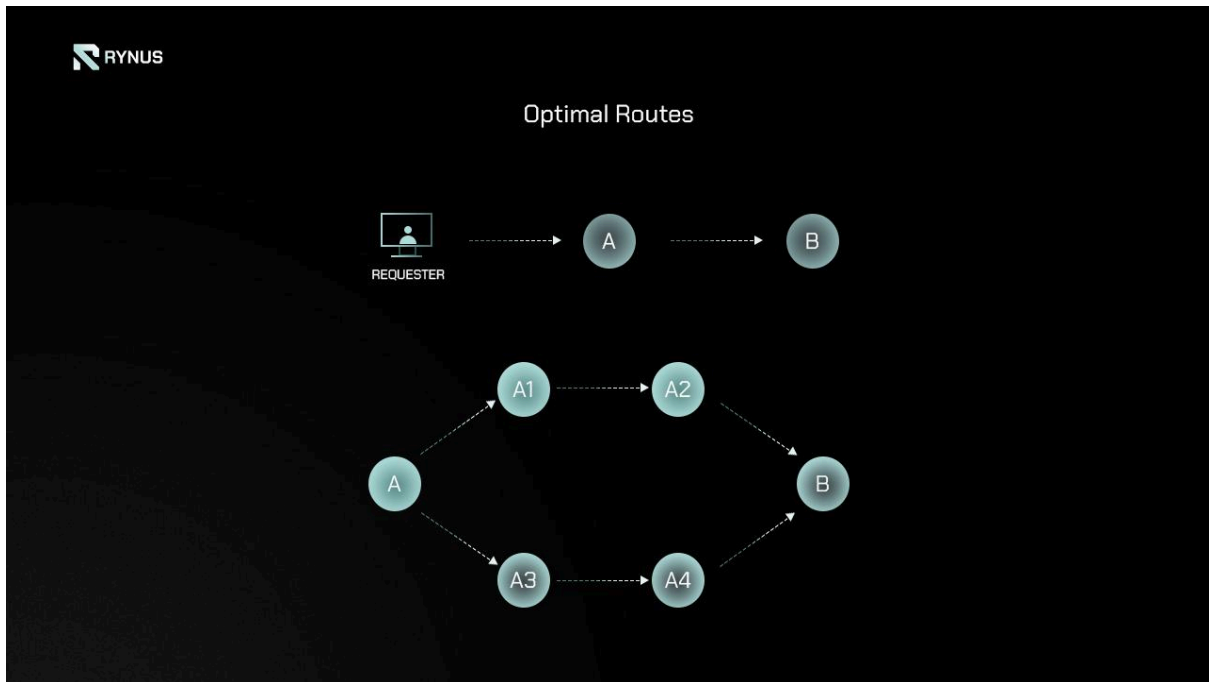
Peer-to-peer transfer

Rynus also develops a Peer-to-peer (P2P) file transfer between Workers, allowing transferring files directly between multiple Workers in the Rynus network. The nodes can communicate and exchange data directly, efficiently utilizing network resources to speed up the file transfer process.
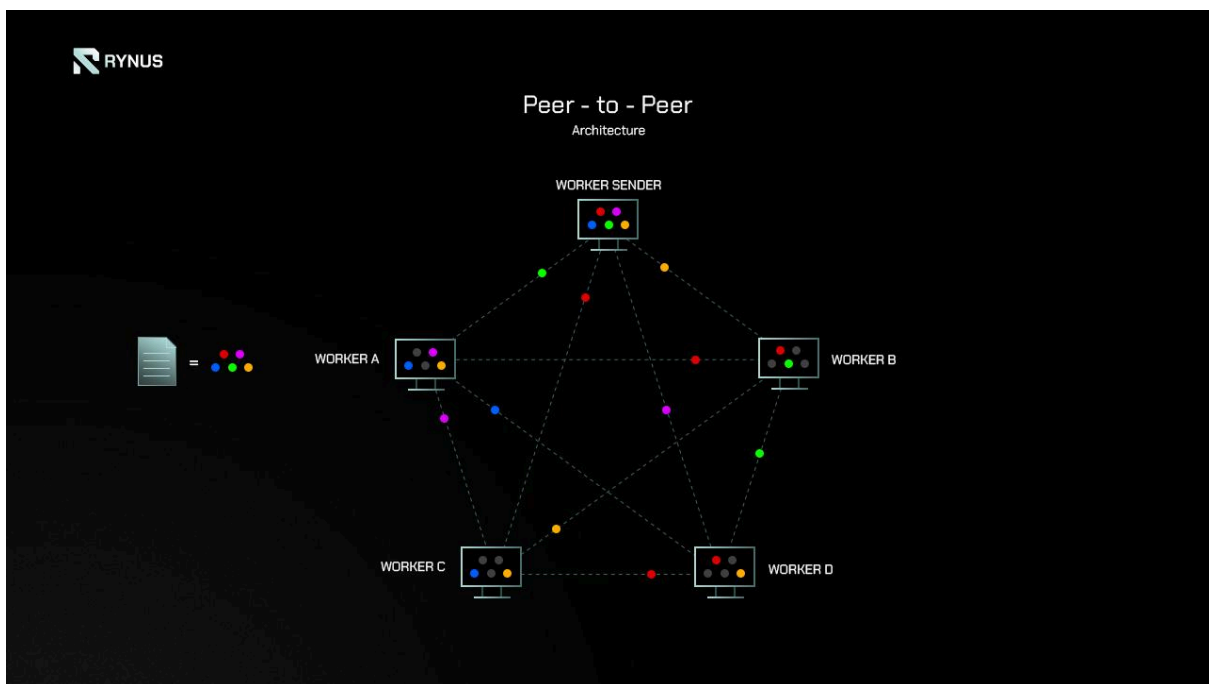
Extensive Experience and Case Studies

Rynus did not embark on building our decentralized network from scratch. We bring over five years of experience in delivering centralized products and services, having successfully handled millions of 3D rendering and AI training jobs for clients. Additionally, we have comprehensive case studies and pipelines for specific AI training and 3D rendering cases.

Tier III Data Center

Rynus operates its own Data Center that meets Uptime Institute's Tier III Standards as well as others such as Operation, Quality Management Standards, Information Security Standards, and Energy Management Standards. Our Local Workers ensure uninterrupted service even before Global Workers join the network.

Platform Compatibility

The current AI training and 3D rendering market is fragmented, with each enterprise and individual having their own pipelines and preferred platforms. Rynus supports all AI platforms and 3D rendering platforms.

For AI, users can build, train, and tune AI, Machine Learning, and Deep Learning models with any AI software like TensorFlow, Jupyter, Anaconda, Python, PyTorch, MXNet, Keras, CNTK, Caffe, and others.

For 3D rendering, users can render with any 3D software, render engines, and plugins, including both real-time rendering (Lumion, Unreal Engine, Twinmotion, Enscape, Chaos Vantage, D5 Render, etc.) and offline rendering (Redshift, OctaneRender, Arnold, V-Ray, iRay, KeyShot, RenderMan, etc.).

GPU Diversity

Rynus supports all types of GPUs from different brands including NVIDIA, AMD, Apple, and Intel. We plan to develop a multi-GPU rendering engine and a plugin for TensorFlow that works with both NVIDIA and AMD GPUs.

Privacy and Security

Rynus adopts new security technologies and ensures the data security of our users with multiple layers of protection.

Data Center Tier III

Rynus Data Center Tier III includes both physical security and data security.

- **Physical Security:** Our Tier III data centers incorporate robust security features such as fences, gates, and security cameras to protect the facility. Additionally, these data centers are strategically located in safe regions to mitigate the risk of natural disasters. The infrastructure is specifically designed to endure events like earthquakes, floods, and fires, ensuring uninterrupted service.

- **Data Security:** To safeguard consumer data, our Tier III data centers deploy advanced security mechanisms including encryption, firewalls, and intrusion detection systems. These measures are crucial in preventing unauthorized access and ensuring the integrity and confidentiality of sensitive information.

Two-Factor Authentication

Two-factor authentication is integrated when logging in to the Rynus Cloud and Transfer application.

Secure Sockets Layer (SSL)

SSL certificates are integrated into the Rynus Cloud, REST APIs, and backend services.

Secure File Transfer Protocol (SFTP)

Files are transferred to the centralized server of Rynus using the Transfer application via SFTP.

Server-Side and Client-Side Encryption

Server-side and Client-side encryption is integrated into REST APIs to encrypt data being transmitted.

AES and RSA Encryption

AES and RSA encryption algorithms are applied across the entire system, including end-user apps and backend services.

End-to-End Encryption (E2EE)

End-to-end encryption is integrated into the Worker application and backend Worker manager.

Profit-Optimized Workers

Rynus's Workers are optimized for profit, combining AI model training, 3D rendering tasks, and coin mining. The Workers seamlessly switch to mining coins during idle time when not receiving AI or 3D rendering jobs.

Decentralized Pricing Controls

Unlike other cloud computing services where the platform or service provider sets the prices, Rynus allows GPU/CPU providers (Workers) to **determine the cost of their hardware**. Workers **bid for computing jobs** based on real-time supply and demand dynamics within the cloud computing market.

This unique approach results in a fluctuating cost structure that reflects current market conditions, ensuring a more equitable and transparent pricing model. By giving Workers control over their pricing, Rynus fosters a decentralized ecosystem driven by market forces. This system not only democratizes the cloud computing market but also aligns with the principles of decentralization and user empowerment, offering greater freedom and fairness to all participants.

Superior Transaction Speed

Transactions per second (TPS) refers to the maximum number of transactions that can be processed by a computer system within a certain amount of time. In the context of blockchains, TPS refers to the number of transactions that a network is capable of processing each second. Bitcoin TPS is 7 transactions per second, Ethereum 1.0 TPS is 30 transactions per second, and Solana TPS is 65,000

transactions per second.

Solana has proven to be the fastest among large blockchains, with a theoretical maximum speed of 65,000 TPS. Rynus leverages Solana for its exceptional transaction processing speed, ensuring swift and efficient handling of transactions on our network.

Rynus Tokenomics

The Rynus Token, or $RYNUS, is the native token of the Rynus Network, and plays a pivotal role in facilitating economic incentives within the network. It serves the needs of three primary groups:

- **Requesters:** Individuals or entities seeking GPU computing power, such as 3D artists, VFX artists, AI engineers, and machine learning engineers.
- **Workers:** Those who provide and monetize their underutilized GPU computing power. This includes render farms, data centers, enterprises, crypto mining farms, professional miners, and individuals.
- **Rynus Token Holders:** Participants who contribute to the network's crypto-economic security and incentives, aligning mutual benefits and penalties among all parties to promote network growth and adoption.

These groups are not mutually exclusive; a Rynus Token Holder can also be a Requester, Worker, or both.

The RYNUS token is designed not only for transactions but also for governance, incentivization, and platform development. With a total supply of 1 billion tokens, Rynus has meticulously planned its token allocation to ensure optimal network growth and balance stakeholder interests in both the short and long term.

Token Utility

The RYNUS token serves multiple essential functions within the network:

Transactional Utility

RYNUS primarily functions as the standard medium of exchange within Rynus Requesters seeking to purchase computing power engage with Workers (GPU nodes), compensating them in RYNUS for their services.

Governance

Additionally, RYNUS tokens play a crucial role in governance. Token Holders have the power to propose, discuss, and vote on platform changes, ensuring Rynus maintains its decentralized model and community-driven development.

Staking

New Workers wishing to contribute to the Rynus network are required to stake RYNUS tokens as an initial commitment. This staking mechanism ensures participants are economically aligned with the platform's objectives. The staked RYNUS tokens act as collateral, providing a protective measure against potential misconduct. Should any Worker deviate from platform standards or engage in malpractice, they risk having a portion or all of their staked tokens slashed.

Token Information

Token Name	RYNUS
Token Ticker	$RYNUS
Blockchain	SOLANA
Token Type	Utility, Governance
Total Supply	1,000,000,000

Token Distribution
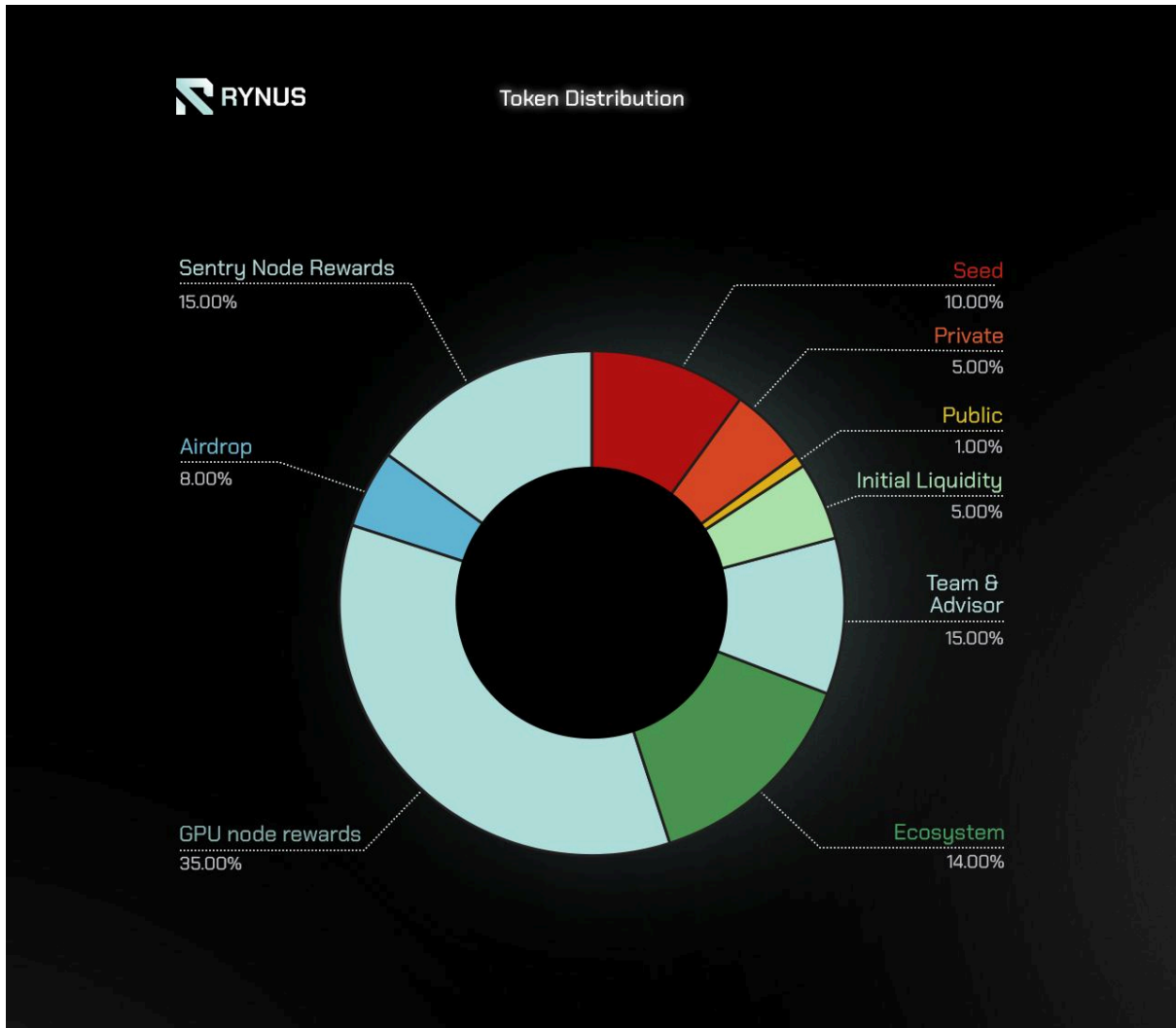
Allocation	Percentage	Unlock schedule
Seed	10.00%	TGE 10.00%, 6m Cliff, 24m Linear Monthly vesting
Private	5.00%	TGE 10.00%, 6m Cliff, 18m Linear Monthly vesting
Public	1.00%	TGE 20.00%, 3m Cliff, 8m Linear Monthly vesting
Initial Liquidity	5.00%	TGE 100.00%, 0m Cliff, 48m Linear Monthly vesting
Team & Advisor	10.00%	TGE 0.00%, 18m Cliff, 36m Linear Monthly vesting
Ecosystem	14.00%	TGE 30.00%, 6m Cliff, 24m Linear Monthly vesting
GPU node rewards	35.00%	TGE 0.00%, 0m Cliff, 48m Linear Monthly vesting
Airdrop	5.00%	TGE 10.00%, 0m Cliff, 24m Linear Monthly vesting
Sentry Node Rewards	15.00%	TGE 0.00%, 0m Cliff, 48m Linear Monthly vesting

Rynus Roadmap

Roadmap outlines Rynus envisioned Products and Milestones, providing high-level details of the functionalities to be delivered.

Phase 1: Core Features and Basic Functionalities

Our initial release focuses on developing the core features of the system and basic functionalities for end-users.

- **Rynus Cloud:** Requesters can create AI model training and rendering jobs, Workers can manage, monitor devices.
- **Rynus Transfer:** Enables basic upload/download of data assets.
- **Rynus Worker:** Receives and processes AI model training and rendering jobs.
- **Community Building**
- **Infrastructure Onboarding**

Phase 2: Expanding Capabilities

Building upon the MVP, the Alpha Product integrates advanced features, security, and utilities, as well as testing and fixing system errors.

- **Rynus Cloud:** Integrate End-to-End Encryption (E2EE), Two-factor authentication, and Captcha.
- **Rynus Transfer:** Implement Peer-To-Peer (P2P) data transfer functionality.
- **Rynus Worker:** Integrate coin mining capability for idle time.

- **Token Generation Event (TGE)**

- **Marketing Partnership**

Phase 3: Enhancing User Experience

The Beta product is released to a select group of end-users from both sides - Requester and Worker - for feedback and continuous improvement.

- **Machine Miner:** Improve parameterization of machine miners on end systems.

- **Data Analysis and Optimization:** Analyze metrics, adjust 'Recommended Hardware' for better balance of supply and demand.

- **Community Governance Structure**

Phase 4: Enhancements and R&D

The End Product is released, with ongoing improvements and updates based on user feedback.

- **Continuous Improvement and Updates:** Regularly releases updates and listens to user feedback.

- **R&D for Future Advancements**

- **Institutional Support**

Rynus Team

Hieu Le	**Founder & CEO** @Rynus	
	Founder & CEO @iRender Farm	
Trung Nguyen	**Co-Founder & CPO** @Rynus	
	Founder @AJ&L, an Architecture Studio since 2016	
Phung Duong	**Co-Founder & CTO** @Rynus	
	Head of AI @iRender Farm	
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	Co-Founder & CEO @Amnis Finance	
Richard Ta	**Technical Advisor** @Rynus	
	Co-Founder @Super Renders Farm	
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