

Alliance Games Whitepaper

Executive Summary

Alliance Games is a decentralized multiplayer infrastructure platform purpose-built to empower game developers, node providers, and players in a unified ecosystem. We solve the fundamental scalability, sustainability, and decentralization challenges that small to mid-sized studios and web3-native games face today.

Traditional multiplayer hosting is cost-prohibitive and inefficient, forcing developers to burn funds on idle virtual machines while waiting for user traction. Alliance Games introduces a **pay-per-session multiplayer hosting model**, where computing resources are only consumed during active gameplay. This eliminates infrastructure waste and allows developers to scale backend costs directly with player adoption.

Unlike many so-called decentralized games that still rely on centralized servers, Alliance Games is **decentralized by design**. Game logic is distributed across a permissionless execution network of independent node providers, while game server executables and NFT metadata are stored immutably on a decentralized file system. Game sessions generate verifiable proofs that are committed to a blockchain-based consensus layer. This ensures the integrity and persistence of session outcomes, allowing the system to propagate verified state to any dApp, web2 backend, or EVM-compatible chain.

We also address the **chicken-and-egg problem** in competitive multiplayer games by integrating a seamless, automated **AI agent system**. Using player inputs and real-time session data, the platform trains adaptive AI opponents that match player skill levels and lobby dynamics. Developers do not need to build their own bots—just having people play their game gradually improves the intelligence and challenge of these agents, keeping queues alive and onboarding friction low.

The platform's native token powers payments, staking, and governance.

- **Developers** pay for hosting using tokens or fiat, with token usage incentivized through built-in discounts.
- **Node providers** stake tokens to run game sessions and earn rewards based on reputation, uptime, and resource capacity.
- **Delegators** can support node operators and share in hosting rewards without maintaining infrastructure.
- **Token holders** gain voting power and can help shape network parameters, such as staking thresholds or reward distribution logic.

Alliance Games serves four core participant groups:

- **Game Developers**, who gain scalable infrastructure, flexible monetization, and zero-effort deployment tools.
- **Node Providers**, from individuals to data centers, who allocate compute power to earn and compete in an open resource market.
- **Players & Communities**, who help sustain games and preserve the value of their assets through continued access.
- **Token Holders & Delegators**, who participate in governance and secure the network while earning rewards from their efforts.

Whether you're building a game, running a node, or collecting NFTs, Alliance Games creates a multiplayer ecosystem that is truly scalable, sustainable, and decentralized—**keeping games alive, fair, and owned by their communities.**

Problem Statement

Delayed Success, Immediate Costs

Competitive multiplayer games typically rely on dynamically hosted game sessions to accommodate players in real time. However, small game studios—and especially solo developers—often lack the time, resources, or technical expertise to set up and maintain scalable hosting environments that meet their needs.

To overcome this, many turn to platforms offering hosting functionality as a service. These platforms often provide access to virtual machines, similar to mainstream cloud providers like AWS or Azure. While powerful, these solutions come with a major drawback for smaller teams: cost inefficiency. In the early stages of a game's life cycle, especially before building a large or active player base, virtual machines often remain idle, draining valuable funds that could be better spent enhancing the player experience or marketing the game.

Moreover, a game's success is not always immediate. Delayed adoption is a common phenomenon, as exemplified by *Among Us*, which was released in 2018 but didn't gain widespread popularity until 2020. In such cases, the burden of maintaining multiplayer infrastructure during periods of low player activity can be unsustainable, forcing developers to shut down servers prematurely, potentially missing out on a later surge in popularity.

This disconnect between infrastructure cost and actual player engagement presents a significant barrier to entry for small studios aiming to build and sustain multiplayer experiences.

The Illusion of Decentralization in Web3 Games

In the Web3 gaming space, many titles rely heavily on competitive mechanics, particularly leaderboards that offer rewards based on player rankings over fixed time periods. These reward

structures are effective at generating short-term hype and player engagement. However, they often come at the cost of one of Web3's core promises: **true decentralization**.

Despite marketing claims, most of these games are hosted on centralized, developer-controlled infrastructure, typically private cloud environments. While in-game assets such as NFTs may be owned by players, the games themselves remain fully dependent on centralized servers. This creates a critical vulnerability: if the game's popularity declines or the developers shut down the servers, the game becomes inaccessible. In such cases, even player-owned NFTs tied to the game may lose all functional value, rendering them effectively worthless.

This issue reflects the broader problem of “**vanishing NFTs**”—a phenomenon where digital assets lose their utility and value due to missing or inaccessible metadata. Without decentralized infrastructure to support the game logic, user progression, and asset interoperability, the decentralization of asset ownership alone is not enough.

Both players and asset holders ultimately benefit only when **the entire game ecosystem**, not just the assets, is decentralized and resilient to shutdowns or central control.

The Player Liquidity Trap in Competitive Games

Competitive games rely on real-time matchmaking to deliver a compelling player-vs-player (PvP) experience. However, these games face a significant early-stage challenge: the **chicken-and-egg problem of player liquidity**. Without a steady base of active players in the queue, new players are unable to find matches, often resulting in frustration and abandonment.

Larger studios can overcome this with aggressive marketing and pre-launch campaigns. Smaller teams, by contrast, are forced to fill the gap by implementing AI opponents that simulate competitive gameplay. This workaround is far from trivial. Developing a competent AI requires substantial time and resources, especially as game mechanics evolve. In fast-moving development cycles, particularly during prototyping, each feature change may demand updates to AI behavior to maintain a balanced and enjoyable experience.

For indie studios or solo developers, this creates a serious bottleneck. Valuable time that could be spent refining core gameplay is diverted toward maintaining AI systems that might only be temporary placeholders. Worse, if the AI is poorly tuned—either too weak or too strong—it can alienate new users. An uninspiring or punishing first impression can prevent casual players from converting into long-term community members.

This early-stage matchmaking void represents a major friction point for launching competitive games without a pre-existing player base or substantial marketing budget.

Solution

Multiplayer Hosting Built for Growth, Not Waste

Alliance Games transforms multiplayer hosting from a sunk cost into a usage-based service, built for sustainability, resurgence, and scale.

Small studios often lack the time, staff, and financial runway to operate scalable multiplayer infrastructure. Traditional cloud services exacerbate this issue by charging for always-on virtual machines, regardless of player activity, leading to significant budget waste, especially in early stages before a player base is established.

Alliance Games introduces a more efficient and accessible approach: pay-per-session hosting. Instead of provisioning always-on infrastructure, compute resources are allocated **only when a player is actively participating in a game session**. This event-driven model drastically reduces costs and ensures developers pay only for actual usage—no idle time, no wasted resources.

Developers can pre-fund their game's wallet with a fixed budget, which is then transparently used to cover real gameplay. Whether that budget is consumed today or in a year, it reflects **actual engagement**, not the cost of keeping virtual machines running in anticipation.

This model empowers developers to keep their games online indefinitely, even if they're no longer actively maintained. If interest resurges later, the infrastructure is still ready to serve players. And if the original developer has moved on, **the community itself can fund and sustain the game**, keeping it alive through collective support.

Decentralized by Design, Not Just in Name

Many Web3 games fall short of true decentralization, relying on developer-controlled infrastructure that can disappear if a project loses traction. When servers go offline, the game becomes unplayable, and NFTs tied to the game lose their functional and economic value.

Alliance Games changes that by running entirely on a decentralized, public cloud network.

This network is powered by **any node provider** who wants to participate, forming a globally distributed and censorship-resistant runtime for game logic. Once a game executable is uploaded to the network, it becomes **a permanent part of the ecosystem**, no longer dependent on the developer's continued involvement.

If the original team disbands or pauses development, the game doesn't vanish. **Players and communities themselves can keep the game alive** by funding or incentivizing node operators to continue hosting it. This empowers the player base to sustain the metagame layer that gives NFTs their utility, ensuring that in-game assets retain meaning and value.

To further protect asset integrity, **Alliance Games also offers decentralized metadata storage** tied directly to the game. This guarantees that NFT attributes and context remain accessible and tamper-proof, eliminating the risk of "vanishing NFTs" due to broken or centralized metadata links.

Instant Competition, Learned from Real Players

Launching a competitive multiplayer game requires a critical mass of active players to sustain enjoyable matchmaking. For small studios, this creates a **chicken-and-egg problem**: without players, there are no matches; without matches, there are no players.

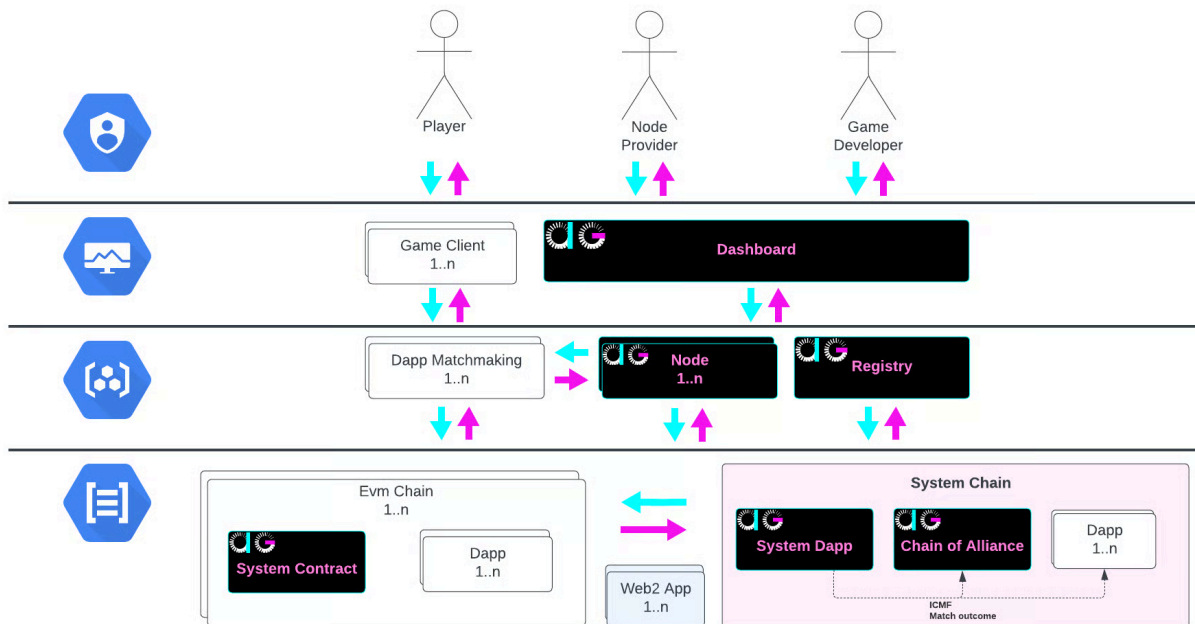
Alliance Games eliminates this bottleneck through built-in, adaptive AI agents that evolve from live gameplay data.

Our infrastructure already tracks the **inputs from each client** and the **real-time state of every game session**. By feeding this data into machine learning models, we generate AI agents that learn directly from how real players interact with the game—no additional developer effort required.

These agents are **immediately available out of the box** and can participate in matchmaking queues, taking into account player-specific metadata such as level, veteran status, and broader lobby context. This ensures that AI opponents provide meaningful, competitive, and appropriately scaled experiences from day one.

As more players engage with the game, the AI improves organically, **learning player behavior over time** and adapting to changes in game mechanics or balance. Developers don't need to build or maintain separate AI logic; the system grows alongside the game, making prototyping and early releases smoother and more player-friendly.

Architecture Overview



The Alliance Games platform is built on a **modular, decentralized infrastructure stack** designed to power the next generation of multiplayer gaming. It leverages **trustless execution**, **token-incentivized compute**, and **immutable storage** to provide a fully composable backend for developers, players, and node operators alike.

This architecture is composed of three synergistic layers: the **Interaction Layer**, the **Execution Layer**, and the **Consensus & Persistence Layer**. Together, they deliver a **scalable, resilient, and developer-friendly** system that abstracts complexity and maximizes flexibility.

Interaction Layer

The Interaction Layer serves as the **user-facing gateway** to the Alliance Games ecosystem. It offers a unified interface where **game developers**, **node providers**, and **players** engage with the network via intuitive dashboards, SDK integrations, and Web2/Web3-compatible clients.

- Developers can deploy, manage, and scale multiplayer titles in a **one-click DevOps pipeline**, enabled by **language-agnostic executables** and smart rollback tooling.
- Node providers configure and manage their infrastructure using a **turnkey installer**, monitor performance metrics, and access a **resource marketplace** where they can pre-commit capacity to specific games for higher selection priority.
- Players enjoy seamless onboarding via **email or wallet login**, participate in hosting dapps, and preserve game state and NFTs through **community-driven runtime persistence**.

The dashboard and SDK work in tandem to simplify game deployment, version control, and telemetry, allowing developers to go from code to live multiplayer session with minimal configuration.

The platform supports **tokenized payments** for on-chain affinity and offers **fiat onramps** to lower the barrier for mainstream adoption, making it the first truly **Web2/Web3 hybrid infrastructure** for multiplayer games.

Execution Layer

The Execution Layer is the platform's **trustless compute fabric**, where game logic is executed in **ephemeral subnets** composed of independently operated nodes. These sessions are spun up dynamically, forming a **verifiable mesh network** where each node contributes compute, memory, and storage to run authoritative game logic.

- The **Registry**, hosted on a decentralized **Filehub**, maintains a permanent record of all published executables, ensuring verifiability and censorship resistance.
- Each session produces **cryptographic proof-of-execution**, collaboratively generated and cross-verified by participating nodes, enabling **provable fairness** and **tamper-proof outcomes**.

Game developers interact with the Execution Layer via the Alliance Games SDK, which provides a unified interface for session initialization, state synchronization, rollback support, and integration with matchmaking, rewards, and AI agent injection. The SDK supports major game engines and abstracts the complexity of working with decentralized infrastructure.

Integrated directly into this layer is a **self-improving AI agent framework** that utilizes real-time telemetry from sessions to train **zero-setup bots**. These AI agents adapt based on player metadata, such as rank or skill level, and provide **organic queue population** to solve the cold-start problem for new games.

The result is a **cloud-native, decentralized edge network** that elastically scales with demand while rewarding performance, availability, and reputation through token incentives.

Consensus & Persistence Layer

The Consensus & Persistence Layer is the **immutable truth layer** of the Alliance Games architecture. It secures game outcomes and player-owned metadata by anchoring them across a **multi-chain trust backbone**.

1. **Session Finality & Consensus** After execution, each session's **verifiable outcome** is submitted to the **System Dapp**, where a **Byzantine-resilient consensus** algorithm verifies correctness. Once finalized, outcomes are broadcast to:
 - Dapps on our System Chain (e.g., for item sync or progression)
 - EVM chains like Ethereum or Avalanche (via bridging)

- Off-chain Web2 services and game databases (via API hooks)
- 2. **Permanent Asset & Metadata Storage** Game-specific NFT metadata, such as skins, upgrades, or in-game progression, is stored on a **decentralized file system**, ensuring data sovereignty, composability, and **perpetual accessibility**—even if the original developer or project ceases to exist.

This layer turns ephemeral gameplay into **auditable, trustless data streams**, enabling games to persist beyond their creators, and making the entire system **interoperable, future-proof, and verifiably fair**.

Scalability and Reliability

Alliance Games is designed from the ground up to offer a robust, scalable, and fault-tolerant infrastructure for multiplayer game hosting in both web3 and traditional gaming environments. Through its modular, decentralized architecture and pay-per-session model, the platform ensures that games remain performant, cost-efficient, and always available.

Horizontal Scalability Through Decentralized Computing

At the core of Alliance Games is a permissionless network of **independently operated nodes**. Any individual, community, or data center can join the network and contribute compute resources. This approach enables **horizontal scalability**, where the total compute capacity of the network can grow dynamically with demand, without a central bottleneck or infrastructure investment from the platform operator.

Developers do not need to provision servers ahead of time. Instead, **nodes are allocated on-demand**, creating short-lived execution environments only when a player initiates a session. This **stateless, session-based model** eliminates over-provisioning and enables the network to scale organically based on actual player activity.

Intelligent Session Distribution & Reputation System

To ensure reliability and fair load balancing, Alliance Games uses a **reputation-based session scheduling system**. Nodes are selected for hosting based on a combination of:

- **Staked tokens**, reflecting their economic commitment and directly influencing a node's likelihood of being selected for hosting sessions.
- **Performance scores**, derived from metrics such as uptime and successful session completions.

This creates **incentives for good behavior** and consistent service, while allowing developers and players to rely on high-quality hosting with predictable performance.

Verifiable Execution & Fault Tolerance

Game sessions are not only executed on one node but verified across a **subnetwork of nodes**. These nodes independently compute the same result from player inputs and game state, generating **verifiable proofs**. This redundancy ensures that:

- Sessions are **trustlessly verified** — no single node can alter or fake results.
- **Fault tolerance** is achieved; if one node fails mid-session, others can recover or continue.
- **Consensus** is formed from the collective result, which is then committed to a blockchain-based layer.

This guarantees the **integrity and reliability** of game outcomes, critical in competitive or reward-based environments.

Persistent & Immutable Storage

To avoid data loss and ensure long-term accessibility, the platform uses decentralized storage for two key components:

- **Game server executables**, stored in a decentralized file registry.
- **Game-related NFT metadata**, ensuring asset value and utility are preserved beyond the lifecycle of any single developer or server.

This **removes reliance on any single hosting provider or backend** and allows games to remain available indefinitely, even if the original developers abandon the project.

Ecosystem

Game Developers

Alliance Games enables developers to deploy multiplayer games using a **flexible, pay-per-session infrastructure**. This drastically reduces upfront and idle infrastructure costs, aligning expenses with actual player activity. Developers can focus on building the gameplay experience they envision, rather than managing backend complexity.

The platform offers a **language-agnostic runtime**, allowing developers to onboard without rewriting their codebase or building custom smart contracts. With **one-click deployment** via a simple UI, games are instantly distributed across the network. Built-in rollback features make it easy to revert to earlier versions during iteration or testing.

While the platform supports Web3-native functionality, it's designed to be inclusive of **traditional game developers**. Payments can be made via fiat or crypto, and onboarding supports standard email logins, removing barriers for teams unfamiliar with blockchain tools. Token-based payments, however, come with discounts and ecosystem benefits, offering a clear path for developers to gradually explore decentralization.

For games with an established or growing player base, Alliance Games also offers **subscription plans**. These plans provide **lower per-session costs** compared to pay-as-you-go pricing, making them ideal for titles with more predictable traffic. Developers can choose the model that best fits their growth stage, scaling from prototyping to production without changing platforms.

Node Providers

Anyone can become a node provider in the Alliance Games network—whether you're an individual with spare compute power, a data center with scalable infrastructure, or even a community project pooling resources. Node providers **earn rewards based on the number of sessions they host**, creating a direct incentive to contribute stable and performant capacity to the network.

Through our **Game Explorer**, node providers can browse available games and selectively lock their resources to specific titles. This targeted commitment increases their **probability of being chosen** to host sessions for those games, fostering a **free market for compute resources** based on demand, game popularity, and network needs.

Each node provider builds a **reputation score** over time, influenced by uptime, reliability, and performance. A strong reputation not only increases hosting opportunities but also attracts **delegated stake** from token holders, further enhancing earnings potential.

Setup is streamlined via an **interactive installer**, optimized for popular Linux distributions. The installer handles all dependencies and configuration, making it simple to launch a compliant node. Once online, nodes are allowed a **maintenance window of up to one hour per month**, ensuring reliability while offering room for updates or downtime.

Alliance Games makes participation in a decentralized runtime network **accessible, rewarding, and scalable** for all types of infrastructure providers.

Players & Communities

Players are at the heart of the Alliance Games ecosystem—not just as users, but as active participants in keeping games alive, accessible, and decentralized. By design, games on Alliance Games **do not rely on a single developer or centralized server** to remain online. As long as players continue to engage with and support a game, it can continue to run indefinitely.

In cases where developers stop maintaining a game, communities can **take ownership of its longevity** by funding the game's session wallet, ensuring that their favorite titles remain playable. This model empowers players to preserve access to the games they care about, regardless of studio activity or hype cycles.

This is especially important in the Web3 space, where game assets like NFTs can lose all utility if the game disappears. By ensuring the **runtime logic and metadata** remain hosted on a decentralized network, Alliance Games protects the value and function of these assets over time. The game logic, once deployed, remains on the network and can be continuously hosted by node providers, even if the original creator is no longer involved.

Players also benefit from **a frictionless experience**: no wallets or tokens are required to start playing. Games can be accessed through traditional login methods, with Web3 functionality available for those who want it. Communities are free to rally around games, organize tournaments, fund hosting, or even promote revivals of older titles—all without needing permission from a central authority.

Alliance Games gives players **real agency**, allowing communities to shape the longevity and success of the games they love.

Token Holder & Delegators

Alliance Games is built to reward not only those who run infrastructure or develop games, but also those who **believe in and support the ecosystem** through token ownership. Token holders play a vital role in shaping the network's growth, security, and governance.

For those who don't want to operate a node directly, **delegation offers another way to participate**. Token holders can delegate their tokens to trusted node providers, contributing to the provider's reputation and increasing their chances of being selected to host sessions. In return, delegators receive a **share of the hosting rewards**, making it a low-effort way to earn yield and support the network.

This model encourages collaboration: reputable nodes attract more delegators, and delegators benefit from backing high-performing infrastructure. Over time, this naturally builds a **market-driven reputation system**, where both technical reliability and community trust play a role in a node's success.

Beyond staking, token holders also participate in **network governance**. As the system matures and decentralizes, key parameters—such as staking requirements, reward curves, or fee structures—can be adjusted through **community proposals and weighted voting**. The more actively a user participates in the ecosystem (by staking or paying with tokens), the **greater their voting power**, ensuring that real contributors have a meaningful voice in decision-making.

Roadmap

