

Goblins Run NFT



Goblins Run is a new blockchain-based game centered around awesomely unique **3D Goblin NFTs** which players can use in exciting battle loops. **10,000 unique collectible characters** with proof of ownership stored on the Ethereum blockchain. A modern movement of CryptoArt.

In "Goblins Run" you'll join a wacky group of goblins as they embark on a hilarious journey to protect their beloved castle from all sorts of zany enemies.

As the leader of the goblin's clan, it's up to you to recruit and train a team of mischievous goblins, each with their own absurd skills and personalities. There's the clumsy goblin, who always manages to trip over his own feet but has a heart of gold. Or the drama goblin, who loves nothing more than a good theatrical performance (even in the midst of battle).

Goblins emerged to steal the enemies' gold from their castle. The Goblins are here to help you build your own castle (with gold = **GRUN Token**) and upgrade troops to protect and celebrate the power of the goblins among the amazing community we created! You will be able to unlock new goblin types and upgrade your existing ones, giving you more options and power in battle. You'll also be able to collect treasure and resources to strengthen your defenses.

As you defend your castle against waves of invading enemies, you'll need to come up with creative and ridiculous strategies to outsmart them. Want to distract your enemies with a well-timed banana peel? Or perhaps you'd prefer to unleash a horde of bunny goblins to cause chaos on the battlefield? The choice is yours!

But beware: the enemies are wily and will stop at nothing to take down your castle. You'll need to stay on your toes (and keep a steady supply of snacks and berries on hand) if you want to emerge victorious. With colorful graphics, absurd humor, and endless replay value, "Goblins Run" is the perfect game for anyone looking to have a laugh while saving the world (or at least their castle).

When the enemies' Raids began, Goblins stood up for their people, and Witches and Knights came to help.

Ultimately, we envision an ever-expanding **Meta-Universe** of this **Play-to-Earn Multiplayer Mobile-Game**. To achieve this, we want to work with the community and other developers to continue adding utility and fun to the Goblins' Run Metaverse.

Roadmap

Jan 2023 - April 2023 - Community Genesis

Everything begins with our community. The focus here is on bootstrapping a powerful group of aligned players who are dedicated to the DAO's long-term mission and goals.

- **End of February** - Genesis Goblins NFT Whitelist Pre-Sale
- **End of February** - Genesis Goblins NFT Public Sale
- **Mid-March** - Phase 1 Witches NFT Sale
- **Mid-March** - Phase 2 Castle NFT Sale
- **End of March** - Phase 3 Knights NFT Sale
- **April** - Phase 4 Land Sale
- **May** - Goblins Run Mobile-Game
- **TBD** - Community GRUN Airdrop

May 2023 - Game Launch

Our initial launch includes the Goblins Run game-loop bringing harvesting, crafting, gathering and the introduction of the GRUN Token marketplace. This phase will focus on Goblins NFT growth and onboarding a new cohort of players.

Q2 - Jousting / Neighborhoods

Next, we will be introducing our first battle loop (Jousting) and an exciting social feature (Neighborhoods). We'll be launching nine Jousting Arenas over time to match each Goblins' class.

Q3 - Running

With Running, players will enter their Goblins in exciting battles across a wide variety of tracks each with unique properties including enemies' attacks!

Q4 - Team RPG

Last but not least, we will be launching a 5v5 Team RPG with PvE and PvP components. This will have the highest skill curve of all currently announced battle loops and is the start of our eSport aspirations.

Gameplay



The primary gameplay in Goblins Run is a battlefield simulation. Players purchase characters and castles NFTs that they can upgrade over time. The Goblins-RunCharacters are the engine of our community-owned economy and is where Goblins, Witches and Knights are evolved.

Land Gameplay

Key Buildings:

- **Farm Plots:** Players can plant seeds to grow berries which are used for potion creation, evolution, and crafting.

- **Defenses:** Protect your empire with defensive buildings, including: **Cannon, Air Defense, Wizard Tower, Bomb Tower, Mortar** and **traps:** Bomb, Giant Bomb, Goblins Trap, Air Bomb.
- **Resources:** Goblins can assign Witches and Wizards to craft items at the Builders' House and Gold Storage from a list of potential recipes. (i.e. potions)
- **Army Camp:** Players can upgrade the army to evolve the level of Goblins, Witches and Knights and their abilities.
- **Other:** Players can craft Obstacles, buy items at the market and upgrade their big Clock Timer.

Types of Land (Plots):

Common:

Common Land is the most basic type of land. Match Goblins to their Land class to boost productivity.

Rare:

Rare land has synergy with an entire Goblin class group (ie. Daily Elements -> Morning, Noon, Afternoon, Evening). Assign Goblins that match Land class groups to boost productivity.

Mythic:

Mythic land is the highest rarity and has a synergy with all Goblin classes. Assign any Goblin to work a Mythic land to boost productivity.

Farm Plots

A player's farm is their "home on the range" within the Goblins Metaverse. It's a completely customizable plot of land with a variety of productive buildings including the Defenses, Resources, Army, Camp, Other, and Farm Plots. Goblins are extremely helpful creatures (so long as you ask nicely!) and love to help around the farm.

Players benefit from working to upgrade their land which increases its productive output.

Berries grow from seeds planted by the player or their goblins!

Players begin by adding farm plots to their Land. They can plant seeds on the farm plots and return later to harvest berries. Did you know that Goblins **LOVE** berries? Players can assign a Goblin when planting seeds to increase berry production. They can further boost berry production by keeping their Goblins properly fed with berries so they don't get hungry at the job!

Initially, players can farm 10 types of berries including plain berries and one berry type for each Goblin class. Players can use berries to evolve Goblins and as ingredients in crafting. When a player plants a seed, they should expect a variable amount of berries corresponding to the seed type planted. Farms get bonuses based on Land adjacency.

The seeds, to plant berries can be either found in-game or bought at the Marketplace with \$GRUN Token. It's important to check back regularly for a good price at the market!

Defenses

Cannon

- The Cannon is a single-target defense that deals moderate damage. It is the first defensive structure that a player builds at the start of their Goblins Run adventure. The player is required to build one during the tutorial.
- Cannons are both cheap and quick to upgrade at lower levels.
- Cannons can shoot any ground unit, such as Goblins and Wizards, but it can't shoot any air units, such as Witches etc.
- Starting from level 7, which requires Castle level 6, the Master Builder can gear up a Cannon to make it resemble a Double Cannon, if he is available. This also requires at least one Double Cannon in the Builder Base to be level 4 or higher, which requires Builder Hall 4.

Bomb Tower

- The Bomb Tower is a Defensive Building, unlocked at Castle Level 2, that throws bombs at ground troops, dealing splash damage similarly to the Wizard Tower. However, unlike the Wizard Tower, it cannot attack air units.
- When its health is reduced to zero, the bomb underneath the tower will be primed, and will explode 1 second afterwards, dealing splash damage to all ground units within 2.75 tiles of it, similar to a Giant Bomb.

Air Defense

- The Air Defense is a powerful turret, unlocked at Castle level 4, that exclusively targets aerial foes with very high DPS, good reach and decent hit-points.
- Air Defenses can only target and shoot one air troop at a time.
- It cannot harm ground-based units or interfere with them in any way other than potentially distracting them from attacking a more valuable target (e.g., the Castle).

Wizard Tower

- The Wizard Tower is a defensive building that looks like a spiraling, cone-shaped tower of rock, then later a crystal-like rock that has a Wizard on the top of it. It is capable of inflicting powerful splash damage to both ground and air units, though it is limited to a relatively short range.
- The Wizard Tower, like the Mortar, excels at mowing down entire groups of troops. However, unlike the Mortar, it has a relatively decent damage per second (making it more effective against higher health troops like Witches), and it will target air troops in addition to ground troops. Also, unlike the Mortar, the Wizard Tower has no blind spot.
- Although the arcane blasts from the Wizard Tower do less damage per shot than the Mortar, it makes up for this by having a much higher rate of fire. This makes the Wizard Tower an excellent choice for defending other structures by blasting troops that get too close.
- The Wizard Tower can target both ground and air troops but can only damage either ground or air with each shot (not both). For example, if a Wizard Tower targets a Witch with some Dragons on top, only the Witch will be damaged, and vice versa.

Mortar

- Mortars are the player's light splash defenses, and is the first unlocked defense capable of doing area damage. Whenever an enemy comes into range, it blasts out an explosive shell that deals area damage.
- Starting at level 8, which is at Castle 10, the Master Builder in the Builder Base can gear up a single Mortar to make it resemble a Multi Mortar. The geared-up Mortar fires bursts of three shots, albeit with reduced damage, and it directly shoots without hesitating at first like regular Mortars. Your Multi Mortar needs to be level 8, which is at Builder Hall 8, or higher in order to gear up your Mortar.
- Mortars shoot long-range explosive shells every 5 seconds which deal devastating splash damage to every ground unit within a small radius of the impact point. Their splash damage, combined with their long-range, makes them deadly weapons against large groups of weaker enemies such as Goblins. Multiple Mortars can sweep away Wizards. The Mortar's low Damage per Second is due to its very slow firing speed; multiplying its DPS

by 5 (its hit speed) will give you its damage per shot, which is the more important stat for Mortars.

- The Mortar shell's explosion is so powerful that it knocks back smaller troops. It is possible that a troop, after getting knocked back, will change its targets depending on the current situation.
- A Mortar's major disadvantages are its inability to attack troops within its 4tile blind spot, its low rate of fire, and low DPS which makes them less effective against high-health troops. It also cannot attack air troops, such as Witches and Dragons.
- Due to the fact that the Mortar's shell takes awhile to reach its target (over a second at maximum range), fast troops like Goblins can easily dodge its attack if they are moving when the Mortar fires.



Traps:

Bomb

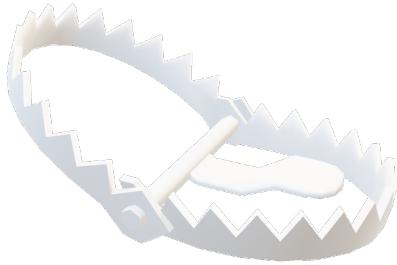
- Bombs are traps that remain hidden until they are activated by an attacking troops moving into their trigger radius like other traps. It is the first such trap unlocked.
- Once triggered, Bombs must be re-armed, which can be done for free and takes place automatically after logging into the game.
- Although they are the weakest of all the traps, Bombs can still have a positive impact on the effectiveness of a village's defense if properly placed, but only if they are always re-armed after triggering.
- Even though Bombs are classified as "Defensive Buildings", they are not buildings and do not need to be triggered/destroyed for your enemy to reach 100% destruction (nor do they count toward it).
- The Bomb explodes approximately 1.5 seconds after an enemy comes within 1 tile of it, causing splash damage to every enemy ground troop within 3 tiles. This delay means that you'll want to place the Bomb in an area where troops are likely to remain for a period of time like right next to a building they're attacking.
- By itself, a single Bomb will not do a great deal of damage to even the weakest of troops (although every bit helps). However, several Bombs in a

cluster can significantly damage or even destroy an entire group of Goblins or Wizards.

Giant Bomb

- The Giant Bomb is the third trap unlocked at Castle level 6. Like the Bomb, the Giant Bomb explodes when an enemy comes into proximity. It is essentially a much more powerful (and expensive) version of the Bomb. This deals splash damage to all enemies within a 3-4 tile radius, depending on the Giant Bomb's level.
- Once activated, the Giant Bomb must be re-armed in order to be a part of the next defense. Doing so is free and occurs automatically once the player logs into the game.
- Giant Bombs can do serious damage to moderate-health troops, such as low-level Dragons or Wizards and usually instantly kill low-health troops such as Goblins.

Goblins Trap

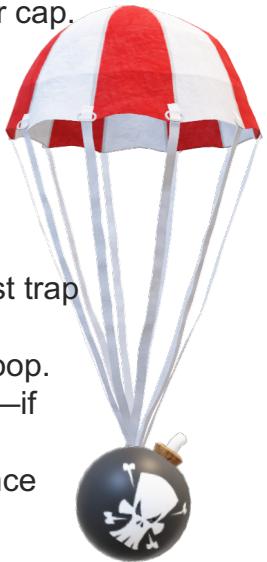


- The Goblins Trap is a trap, unlocked at Castle level 8, that remains hidden until they are activated by an attacking troop moving into their trigger radius. Once triggered, the coffin rises from the ground and multiple Goblins appear in the area around the coffin to attack nearby troops depending on whether it is set for ground or air troops. You can see the difference above using the Toggle Mode feature.
- Once activated, the Goblins Trap must be re-armed in order to be a part of the next defense. Doing so is free and occurs automatically once the player logs into the game.
- They can be configured to attack either ground troops or air troops.
- They will remain invisible if set to ground and an air troop passes over (and vice versa).
- The number of Goblins released depends on the level of the Goblins Trap.
- The Goblins released have a small skull icon next to them to signify they came from a Goblins Trap (as opposed to being summoned by a Witch), similar to the icon displayed next to Clan Castle troops. The reason behind this is that they play an equal role to the Goblins summoned by a defending Witch in the Clan Castle.

- The Goblins from the Goblins Trap have very similar stats to the Goblins summoned by the Witch. While Goblins from Goblins Trap have the same DPS and hitpoints, they attack slightly faster, and air Goblins move slightly slower.
- Goblins Traps set to defend against air troops have wings instead of a skull on the face of the coffin. Goblins that arise from being triggered while set to defend against air troops float through the air with the aid of a propeller cap.

Air Bomb

- The Air Bomb is the second trap unlocked at Castle level 5. It is the first trap that targets aerial troops. It triggers when a flying troop comes into proximity, then rises out of the ground and follows the nearest flying troop. The Air Bomb explodes after coming in contact with the flying troop or—if dead—the location of its death.
- Despite the name, it is not an airborne version of the normal Bomb, since the Air Bomb is able to move around.
- It is extremely effective against large groups of Goblins and does a significant amount of damage to Witches (especially level 3 and below). It's much less effective against higher health targets such as Dragons.
- Like other traps, the Air Bomb requires re-arming after it has been activated. Doing so is free and occurs automatically once the player logs into the game.



Resources

Builders House

- Special items are stored inside your Builders' House. Within their interfaces, you will have the ability to see the full list of all the Magic Items, the ones you have acquired being first. You can also read descriptions.
- Magic Items provide benefits to your buildings, your troops, your heroes, spells, and anything else in-game.
- Some Magic Items will provide boosts to production, while others will instantly complete an upgrade in progress, as well as other miscellaneous benefits.
- If you have a Magic Item you don't need, then you have the option to cash in that Magic Item for \$GRUN.
- There are six ways to obtain Magic Items: by achieving certain reward tiers in Goblins Run, by completing objectives in certain Events, by buying them through War League Medals, by buying them through the Trader or by buying them in the shop for real money.

- Relevant Magic Items (such as the Power Potion) are available for use in Goblins Attacks.
- Your inventory of Magic Items can be accessed through the Castle or Builders Tent, though some Magic Items cannot be used directly from this inventory screen.
- Magic Items cannot be stolen by attackers in any way.

Gold Storage

- The Gold Storage stores \$GRUN, a resource which is used for constructing and upgrading buildings in the Builder Base.
- The Gold Storage is still entirely functional when upgrading.
- The Gold Storage is upgraded using \$GRUN.
- Unlike Gold Storages in the Home Village, Versus Battle opponents are unable to steal Builder Gold from Gold Storages in the Builder Base.
- The Army Camps are where your troops go when they're done training. All troops except Goblins will take up more than one housing space. Upgrading and building more Army Camps lets you store more troops, allowing higher chances of victory in raids.
- They continue to function even when they are being upgraded, allowing you to keep your armies at full capacity at all times.
- Unlike Clan Castle troops, troops stationed in the Army Camp do not defend your village during an attack. In fact, they do not appear on the attacker's map at all (Army Camps, full or not, will appear empty to an attacker).

Army Camp



- The maximum housing spaces you can have for your troops is 300 (4 Army Camps x 75 spaces). This increases to 345 if you include the extra 45 in a level 9 or higher Clan Castle at Castle 13 or 14.
- Army Camps also occupy a lot of space (4x4).
- It is always preferable to initially build all available Army Camps and then upgrade the lowest-level ones first. Every time you upgrade (except upgrading to level 2) the Camp only gains 5 more housing space and it costs more \$GRUN the more you upgrade. The next level is usually much more expensive than the one before it.
- Army Camps have a unique hitbox, unlike other buildings. That means that attacking troops will have to walk right to the center where the campfire is located in order to attack the Army Camp.
- Clan Castle troops do not go into the Army Camp when donated and thus do not take housing space in the Army Camp; they instead go to the Clan Castle.
- You can dismiss any troops from the Army Camps, but the troop cost is not refunded.

Others

Clock Timer

- The Clock Tower is a building that can be repaired at Builder Hall Level 4. When activated, the Clock Tower can multiply a battles' time sequence.
- It appears to be a tower with a clock on top, in which a hand turns clockwise. The Clock Tower's hand turns very fast when boosting.
- The Clock Tower will occasionally make a free boost available. Once a free boost has been completely expended, there will be a 2-hour cooldown before the next free boost is available.
- If the Clock Tower is not active, it can also be activated using \$GRUN. A Clock Tower Potion can also be used to boost the Clock Tower for 30 minutes at any time (this duration is independent of Clock Tower level, and the potion works regardless of whether the Clock Tower is active).

Goblins Run NFT's

There will be 5 major NFT collections:

- 10K Goblins
- 5k Land-Plots
- 2k Castles
- 6k Knights
- 4k Witches

(more to come...)

All NFT's can be connected to the game and provide in-game benefits.



Many crypto-based games rely on a simple lending feature that enables the ecosystem of play & earn guilds. Traditional solutions create a lot of overhead for managers and aren't trustless for scholars. More recent projects have added lending marketplaces that allow anyone to lend out assets for predetermined rates. With Goblins Run we intend to utilize a staking or delegate system which enables both the lending of assets as well as trustless revenue share (ie. automated payment flows). We plan to implement this functionality shortly after MvP game launch.

Goblins Run Marketplace

This feature is a form of light PvP at the center of our battle gameplay. Effectively players buy and sell berries, materials, and booster items for \$GRUN Tokens via a real-time marketplace.

The GRM Marketplace leverages bonding curves as the pricing mechanism per bundle. Every time a player buys or sells a bundle the listing price is adjusted based on the underlying bonding curve.

This is a peer-to-peer marketplace where each item has a bonding curve. Players can collectively influence the price of bundles (denominated in GRM) as they buy and sell. Each day there will be a new set of bundles listed in the marketplace allowing players to trade against each other.

Goblins Run Token - \$GRUN



\$GRUN Tokens are the primary value token for the Goblin multiverse. Holders will be able to utilize these tokens in a variety of ways including;

- Stake to vote on DAO governance and earn staking rewards
- Purchase high-value boosters, items, and materials from the GRUN Marketplace
- Evolve Goblins
- Pay entry fees for Battles
- And much more to be announced...

The ultimate goal of GRUN is to decentralize the ownership and governance of the Goblins Run Treasury and IP.

Multi-Sig Wallet Treasury

Funds are secured by an industry-standard Gnosis multisig wallet. The Treasury wallet keys are held by 5 members of the Goblins Run Games team. Any transaction will require 3 of 5 signatures to execute. *Please note: we are currently in the process of moving to a 5 of 8 multisig.* This helps to protect the project against hacks and malicious team members. We share the address below in the interest of absolute transparency with our community. Anyone can view transactions as they are submitted for approval and see the history of every past transaction.

Treasury Address

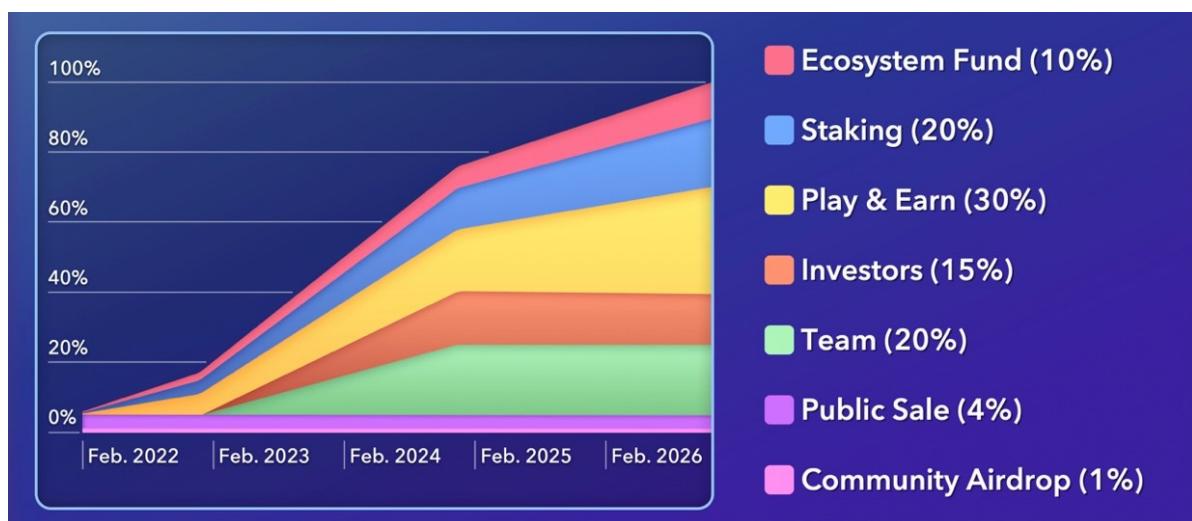
As we launch \$GRUN we'll update this section to include the multi-sig addresses for each token pool (ie. Ecosystem fund, Team, Investors, etc) so transparency extends beyond the Treasury to all \$GRUN token allocations.

Allocation and Unlock Schedule

Total Supply = 1,000,000,000 Initial Circulating Supply = 50,000,000

Category	Allocation	%	Notes
Play & Earn	300.000.000	30%	In-Game Rewards
Staking	200.000.000	20%	Token Staking Rewards + LP incentives

Team	200.000.000	20%	1 year lock + 2 year linear unlock
Ecosystem Fund	100.000.000	10%	Growth/Development
Investors	150.000.000	15%	1 year lock + 2 year linear unlock
Public Sale	40.000.000	4%	Instant Unlock
Community Airdrop	10.000.000	1%	Instant Unlock
Total	1.000.000.000	100%	



Play & Earn

In Goblins Run - Players will have several ways to Play and Earn including:

- Harvesting Class Berries and selling them on the market
- Gathering on Lands Crafting, Evolution, and Building Materials and selling them on the market
- Harvesting and crafting upgrade materials
- Entering Jousting events and tournaments
- PvE and PvP Battle

Token Amount	% of total supply	unlock schedule
300.000.000	30%	Gradual unlock over ~ 5 years

Team

JM-Games, Inc. is the development team behind Goblins Run and should maintain an incentive to continue supporting and building indefinitely. The development team will receive 20% of the total token supply with a 1 year lock and a 24 month linear unlock.

Token Amount	% of total supply	Unlock schedule
200.000.000	20%	1 year lock + 2 year linear unlock

Ecosystem Fund

Until the DAO is fully activated JM-Games will directly manage the Ecosystem Fund. Its purpose is to further the development of Goblins Run and foster community growth. Until control is passed to the community, JM-Games will provide annual statements detailing the use of funds. Post integration with the voting dashboard the community will take over and begin voting directly on how the fund should be allocated. Our goal is for this to occur by the end of 2022.

We view the Ecosystem fund as an onboarding mechanism for new partners across a variety of areas including:

- Game Loop Development
- Join us in building out new experiences for our player community.
- Growth Marketing
- Help us spread Goblin fever globally!
- Auxiliary Services
- Public Analytics Dashboards • Goblin Trading Marketplace
- And much much more!

Token Amount	% of total supply	Unlock schedule
100.000.000	10%	Gradual unlock over ~ 5 years

Investors

JM-Games is in contact with multiple investors in Q1 2023. GRUN Token investors can purchase GRUN at a de minimis price in exchange for fiat to fund the development of Goblins Run as well as general operating costs. All investors are subject to a 1-year lock followed by a 24 month linear unlock.

Token Amount	% of total supply	Unlock schedule
150.000.000	15%	1 year lock + 2 year linear unlock

Public Sale

On March 17th, 2022 we will launch a Public Token Sale via the Copper Launch platform on Polygon. The structure of the sale leverages Balancer's Bootstrapped Liquidity Pool mechanism.

The Public Sale will include 40MM GRUN tokens, but given the mechanics of a bootstrapping liquidity pool, the tokens will not sell out. We will reserve the remaining tokens for future financing and potential airdrops.

Token Amount	% of total supply	Unlock schedule
40.000.000	4%	Instant Unlock

Community Airdrop

Shortly following our public sale we will airdrop one percent (1%) of the total supply — **10,000,000 GRUN** — to loyal community members to give them a head start in the game!

Governance

JM-Games, Inc. is committed to decentralizing Goblins Run via the GRUN governance token. This process will occur over the coming years as we distribute GRUN to players and community members who can in turn stake GRUN to participate in governance. As a result, JM-Games' and our investors' ownership and control will gradually decline over time.

Component	Initial Design Choice
Treasury	Gnosis Safe
Governance	Gnosis Snapshot
Token	Goblins Run Token (GRUN)
Gnosis Safe Owner	Multisig
Gnosis Snapshot Owner	Multisig

Roadmap

- **Phase 0 - Token Genesis** - Launch of GRUN via Public Sale - No Voting / Staking
- **Phase 1 - Staking Launch** - Staking Dashboard • **Phase 2 - Voting Launch** - Voting System
- **Phase 3 - DAO** - Enhance governance control via the decentralization of smart contract upgrades.

With the launch of Phase 2 people who choose to stake their GRUN can participate in key governance decisions and earn rewards. To incentivize long-term holders and people genuinely interested in furthering the Goblins Run community we are leveraging a familiar voting lockup strategy seen in DeFi.

Players stake tokens according to various timelocks. The longer the staking period, the more sGRUN (staked GRUN) governance tokens they receive.

- **1 Month** - 1 GRUN = 0.5 sGRUN
- **3 Month** - 1 GRUN = 1 sGRUN
- **6 Month** - 1 GRUN = 1.5 sGRUN
- **12 Month** - 1 GRUN = 2 sGRUN

Staking rewards (GRUN) are distributed to holders of sGRUN daily. As a result, players with longer time horizons will earn more staking rewards and have an outsized vote on governance decisions. In order to build a generational IP, we must maximize long-term incentive alignment across all participants.

Important Note: The Team and Investor allocations are locked per the schedule outlined here. While locked we can stake and vote on governance decisions but will not earn staking rewards. Our tokens will be represented as “locked staked GRUN” (lsGRUN). We feel this is the fairest for our community members and puts us on the strongest path to decentralization.

Why Polygon Chain:

Polygon is an entire ecosystem of scaling solutions built on top of the Ethereum Mainnet. When looking to select a protocol to launch on we wanted to find the solution that best aligned with our long-term goals and maximized our flexibility overtime.

Polygon represents an internet of blockchains that sits on top of Ethereum. They took a [similar approach](#) to Cosmos but wisely chose not to directly compete as an L1. This in combination with their expansion into zkRollup technology as well as [Polygon Edge](#) give us plenty of options as developers to react to changing market conditions. For example, it's likely we'll expand from Polygon's PoS network to either an EVM compatible zkRollup (Miden/Zero) or to an application specific side chain via Edge. This flexibility and variety of choice is another of the many reasons we believe in the long term viability of the Polygon ecosystem.

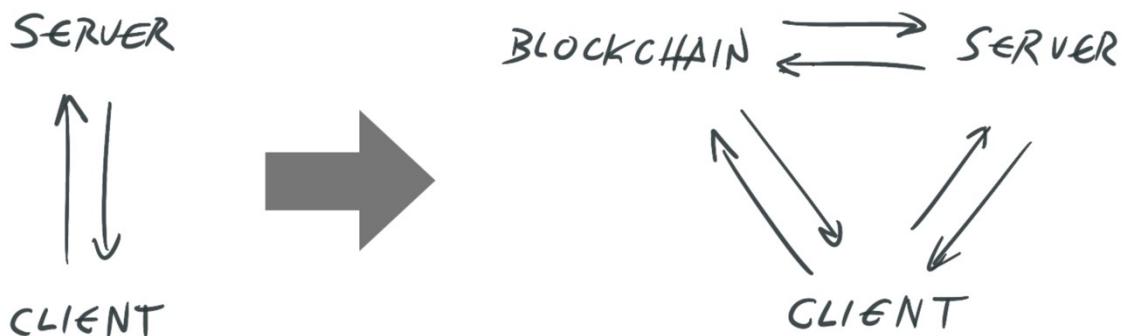
Server Signing

Goals:

- Keep value-critical computations on blockchain to ensure fairness and transparency.
- Prevent cheating from man-in-the-middle data injection attacks.
- Give players control over alterations/upgrades to the NFTs.
- Allow complex gameplay actions like spending cryptocurrency and soft currency “at the same time.”

Background Context:

In the past, games stored data and processed actions in two places; the client is the authority over player input, and the server is the authority over the recorded gamestate. Goblins Run introduces the blockchain as a third member of the system. With crypto-based games, data now needs to be replicated to two other parties.



The blockchain introduces limitations that we need to account for:

- Smart contracts cannot “read” data from an API. The blockchain cannot make REST calls out to an endpoint. **The only stateful information the blockchain can access comes from function parameters or saved state from previous function parameters.**
- Any RPC that mutates data on the blockchain is executed asynchronously. Putting a transaction into the queue does not guarantee that it will be processed or that it will succeed. Sometimes a transaction can take minutes or hours to resolve.
- Polygon writes new blocks about every 2 seconds, which causes frequent Uncle Blocks. The more confirmations added on top of our transaction, the less likely it will be orphaned. This leads to a grey area where a processed transaction may still be undone. We combat this by waiting for more confirmation blocks (20-80 blocks) before accepting transaction events.

Our Solution:

A generalized system/pattern that allows the player to call blockchain functions which include arguments that have been cryptographically signed by the server.



In the general case, the sequence of events will be:

- 1. A player takes an action which requires a blockchain transaction (state change) using data from the server.
- 2. The front-end sends this request to the game server.
- 3. The game server verifies the request, deducts any in-game resources being spent, and generates a payload for the blockchain.
- 4. The game server uses a private key to sign the payload.
- 5. The signed payload is returned to the client which adds it as an argument of the web3 function call.

- 6. The client prompts the player to sign the web3 transaction with their Metamask wallet and submit the transaction.
- 7. The smart contract uses the server's public key to verify that the payload is authentic before executing the transaction.
- 8. The smart contract emits an event letting any listeners (front end, back end, etc) know that the transaction finished.

NFT Airlock

Goals:

- NFTs are always kept in the player's wallet (no staking or custody).
- NFTs inside the airlock can't be transferred/sold to another wallet.
- NFTs outside the airlock don't affect the game.
- NFT metadata is volatile inside the airlock and static outside the airlock.
- Locking and unlocking transactions are always performed by the player.

Background Context:

The data model for NFTs (Goblins, Land, Castles, Witches and Wizards) is stored in three different storage locations. Each location is the “source of truth” for part of the NFT’s record.

- **Polygon Blockchain:** Ownership of NFTs Data that persists when an NFT is sold or transferred between players. The base information used to deserialize a Unicorn or Land: DNA, Class, Body Parts, etc. Data that shows value (either money or time invested): rarity, level etc.
- **Arweave Metadata (JSON)** Supplemental information to the NFT is stored on a second blockchain (Arweave Permaweb) which is optimized for permanent file storage. The json file is the source of truth for “content” such as the name and portrait image for an NFT. Metadata follows the OpenSea Standard. This data is largely for display purposes, so some duplicate data is cached. The main examples are Stats derived entirely from data on the NFT which require a complex calculation; Goblin metadata saves the derived stats for easy reference on OpenSea and similar marketplaces. The metadata json file is regenerated when something changes that needs to be visible on the marketplace, such as land leveling up, or egg hatching.

- **Game Server** The game server owns volatile game state, such as cooldown timers, Goblin energy, and Land positions in LOD2. Storage on the server is fast and cheap to both read and write so the server may cache data from the other two stores for better performance.

On-Chain Mini Games

This launch encapsulated a bunch of our high-level goals for Goblins Run including;

- This is a mini-game that is entirely on-chain and encapsulated into a smart contract.
- It was developed in collaboration with an external development team (shout out to our analytics partner Moonstream!).
- We see this as a template for many future collaborations in which we work with external development teams to add utility to our NFT assets.

Our plan is to build many more games like this in the future that give players fun experiences around the NFTs they own!

NFT Rights & Ownership

1. You Own the NFT

Each Goblins Run avatar is an NFT on the Ethereum blockchain. When you purchase an NFT, you own the underlying Goblins Run NFT, the Art, completely. Ownership of the NFT is mediated entirely by the Smart Contract and the Ethereum Network: at no point may we seize, freeze, or otherwise modify the ownership of any Goblins Run NFT.

2. Personal Use

Subject to your continued compliance with these Terms, JM-Games, Inc. grants you a worldwide, royalty-free license to use, copy, and display the purchased Art, along with any extensions that you choose to create or use, solely for the following purposes: (i) for your own personal, non-commercial use; (ii) as part of a marketplace that permits the purchase and sale of your Goblins Run NFT, provided that the marketplace cryptographically verifies each Goblins Run NFT owner's rights to display the Art for their Goblins Run NFT to ensure that only the actual owner can display the Art; or (iii) as part of a third party website or application that permits the inclusion, involvement, or participation of your Goblins

Run NFT, provided that the website/application cryptographically verifies each Goblins Run NFT owner's rights to display the Art for their Goblins Run NFT to ensure that only the actual owner can display the Art, and provided that the Art is no longer visible once the owner of the Goblins Run NFT leaves the website/application.

3. Commercial Use

Subject to your continued compliance with these Terms, JM-Games, Inc. grants you an unlimited, worldwide license to use, copy, and display the purchased Art for the purpose of creating derivative works based upon the Art ("Commercial Use"). Examples of such Commercial Use would e.g. be the use of the Art to produce and sell merchandise products (T-Shirts etc.) displaying copies of the Art. For the sake of clarity, nothing in this Section will be deemed to restrict you from

(i) owning or operating a marketplace that permits the use and sale of Goblins Run NFT generally, provided that the marketplace cryptographically verifies each Goblins Run NFT owner's rights to display the Art for their Goblins Run NFT to ensure that only the actual owner can display the Art; (ii) owning or operating a third party website or application that permits the inclusion, involvement, or participation of Goblins Run NFT generally, provided that the third party website or application cryptographically verifies each Goblins Run NFT.