



Forgotten Universe

WHITEPAPER



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Disclaimer

This document reflects the plans for Forgotten Runiverse at the time of publication. The exact mechanics, numbers, and overall balance of the game is subject to change due to the nature of development as we test and iterate on design and implementation. This document should also not be seen as a financial document and does not reflect financial advice or forecasting.

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1.0

What is Forgotten Runiverse?

Forgotten Runiverse is a vast and magical MMORPG unique in its player-owned and driven world and economy. In Forgotten Runiverse, players are able to create their own stories and experiences with extensive crafting, exploration, and crafting systems that form a vibrant, ever-evolving world for MMO players and blockchain enthusiasts alike. The Runiverse is here to create a life-long community and is developed by game industry veterans with experience at Blizzard, Ubisoft, Capcom, Digital Extremes, Nexon, TinyCo., and others with support from web3 visionary partners such as Magic Machine, Polygon/Offchain Labs, Dialectic, 776, Deeze, Soby, and Fiskantes.

This document outlines the core game design and the ways in which Forgotten Runiverse will make use of tokenized land to provide players with a magical gameplay experience. **The phrase "Create to Earn" manifests itself in many ways throughout the design principles explored below.**

1.1

Game Overview

Developed by Bisonic, Inc., Forgotten Runiverse is a free-to-play, web-based pixel art MMORPG inspired by Magic Machine's Forgotten Runes Wizard Cult. As a web3 fantasy experience, Forgotten Runiverse will feature a "create to earn" economy where players are able to claim full ownership of any item they create in game by minting it to the Ethereum Blockchain.

The gameplay and experience of Forgotten Runiverse draws from mechanics of other great games such as Runescape, Chrono Trigger, Stardew Valley, Ultima Online, and World of Warcraft. Unlike these games, however, Forgotten Runiverse seamlessly integrates player-owned land as a core part of its gameplay design enabling players to enhance their experience and opening a new path to earning in-game resources. Through a novel incentive system, players will utilize their land to improve the experience of fellow players while earning ever higher bonuses for the value that they create. Land is a universal part of the player experience that provides resources used to craft items, level up characters, and unlock content.

Surrounding the technical details of gameplay design and is the mythical realm infused with community-created lore and experiences known as the Runiverse. Within this vast fantasy world, players may choose to journey alone or in groups to discover its endless possibilities - battle, gather resources, craft weapons, decorate homes, construct and manage buildings, socialize, and more. The Runiverse is a place of adventure, danger, and endless discovery for gamers who have the courage to explore and unearth the hidden treasures that await them.

To begin the adventure, a player must create a game account which they may then link to a crypto wallet. Players not connected to a wallet can enjoy the core of the game as a free to play MMORPG, while players who use a crypto wallet can enjoy additional features like Land Ownership and Management, an NFT Marketplace, access to the Secret Tower and Wizard Styles (if they own a Wizard in the original Forgotten Runes 10K collection).



1.2

Onboarding the Masses

It is the aim of Forgotten Runiverse to mirror as closely as possible the more traditional onboarding of large-scale free-to-play MMORPGs to create an engaging and rewarding experience for traditional gamers with no blockchain experience. In our view, interacting with the blockchain will become a natural part of the gameplay experience for players as they produce content in the game and decide to take full advantage of the ownership that blockchain provides them. We see our future as mass-adoption through low barriers and familiar content with new benefits and experiences for players.

As a live-service game, we foresee a long future of ever expanding content for players to experience.

1.3

Game Rollout & Expansion

The Forgotten Runiverse is a live-service game. As an initial introduction to the magic and wonder of possibilities of the Runiverse, the Open Beta will deliver an initial array of quests, enemies, and craftable items across a portion of the overall world map. Similar to other MMOs and live-service games, more content will continue to be developed and released to expand the world that players can experience and the variety of enemies, quests, items, and features of the game. The exact content and features that will be added may change over time to align with feedback from the community and the overall direction of the lore and stories created by the Forgotten Runes community.

Alpha	Closed Beta	Open Beta
Max Playtime: 160hrs Avg. Playtime: 30-50hr	Max Playtime: 320 hrs Avg. Playtime: 120-180 hrs	Max Playtime: 500 hrs Avg. Playtime: 120-180hrs
World: Level 15 Player Progression 6 Instanced Wild Areas 4 Cities 3 Dungeons 9 Dungeon Stories	World: Level 25 Player Progression 36 World Regions 6 Cities 2 NPC Areas 10 Dungeons 20 Dungeon Stories 80 Quests	World: Level 50 Player Progression 36 World Regions 10 Cities 7 NPC Areas 21 Dungeons ?? Dungeon Stories 200 Quests
Building: 4 Housing Architectural Styles 1 Service Building 6 Gathering Station Types	Building: 7 Housing Architectural Styles 7 Service Buildings 6 Gathering Station Types	Building: 7 Housing Architectural Styles 7 Service Buildings 6 Gathering Station Types
Combat: 21 Spells 22 Standard + Elite Enemies Instanced Region Encounters	Combat: 153 Spells 42 Specializations 40 Standard + Elite Enemies 10 Bosses 1 Free-for-all PvP Area	Combat: 200-300 Spells 63-84 Specializations 40-72 Enemies 21 Bosses Ranked PvP Matchmaking 2 Narrative PvP Arenas 1 Free-for-All PvP Area
Crafting: 21 Crystal Recipes 65 Equipment Pieces 10 Decorations 24 Physical Materials 21 Spiritual Materials	Crafting: 153 Crystal Recipes 420 Equipment Recipes 60 Decoration Recipes 43 Physical Materials 26 Spiritual Materials	Crafting: 200-300 Crystal Recipes 840 Equipment Recipes 200 Decoration Recipes 43 Physical Materials 43 Spiritual Materials

Only 70,000 Land Plots will ever exist in the Runiverse. Given the live-service and expanding nature of the Forgotten Runiverse world map, this means that only a portion of those Land Plots will exist at the Open Beta release, and more will be incorporated as the game world expands. The map below illustrates this where a portion of the world is unrevealed or 'forgotten' - as the game expands, the shroud will pull back to reveal new areas, experiences, and player-owned plots. In this way, early plots will be improved from the initial release and take advantage of game growth and updates. The initial launch of plots in the Runiverse will be the most central to the game's initial playable areas and content. As the game grows, we will release new plots up to the world limit of 70,000 plots spread across the entirety of the Runiverse.

Fig. : Example map of the game world illustrating the initial discoverable portion of the world.





1.4

The World

The entire planned world of the Forgotten Runiverse is massive at over 200 km². In the initial release of the game, the explorable world will span almost 76 km² and be composed of 36 different Regions, each with their own unique visuals, enemies, resources and experiences.



Each Region has a unique set of Essence Strengths aligning them with Fire, Water, Earth, Lightning, Wind, Chaos, and Light. These Essence Strengths determine how many Material Extractions are available for each Material Type within the Region. As one might imagine, this means that some regions like the Far Jungle might be richer in resources like wood, while other Regions like the Eagle Peaks might be richer in ore deposits.

Across the Runiverse, traversable land within regions will fall into the following types:

THE WILDERNESS

The Openness corresponds to all the vast open spaces within the World that Players can explore. In the Openness, Players will find Player-owned Plots, Gathering Nodes that can be harvested, enemies they can fight to gain experience and resources, and Areas of Interest (which can be Quest-related Locales or Dungeons).

WILD AREAS

Wild Areas correspond to special zones where Players can encounter thematic challenges and rewards (e.g. a dark, spooky graveyard).

NPC HUBS

Throughout the Runiverse, Players will come across NPC Areas—Small, non-instanced NPC Hubs where Players can find Quests and Tradeposts. Upon release, there will be 7 of these accessible to Players; Zaros, Kobold's Crossing, Fur Gnome Town, Hedge Wizard Encampment, Evermoore, and the Sacred Pillars.

CITIES

Cities are large, partially Player-owned Hubs that are accessed through a special interface when you're close. Each city is composed of a number of NPC Areas (which correspond to unique Districts or Areas of Interest) and a number of partially Player-owned Neighborhoods.

Each City has a special NPC Area called the "Commercial District" where Players can find beginner level Service Buildings of every type to start their journey. For release, the Runiverse will have 7 Cities:

1. **Marketropolis:** Ruled by greedy aristocrats, the Red Wizard's capital is home to the Stock Sanctuary, where Players will eventually participate in a simulated stock market to earn rewards.
2. **Evershine:** Known as the most hedonistic of places, this city is home to the Yellow Wizards and the Runway, where Players will be able to show off their looks and compete for prizes.

3. **Cerulean Academy:** Organized under the mantle of The University, the Blue Wizard's home is a place where Players will be able to share their knowledge and learn the stories of the world.
4. **Gardenoa:** Dedicated to preservation of the balance within the world, the Green Wizard's city protects the Green Vault, where Players will eventually be able to grow their own gardens.
5. **Alessar's Keep:** Home to the Great Zoo, where Players will eventually be able to display Bosses they've defeated.
Calista's Citadel: This colorful City houses The Arcade - a smorgasbord of minigames.
6. **Goblin Town:** What some might term a troublesome pile of clay, Goblin Town is not for the faint of heart (as evidenced by The Pits, where Players can enroll in PvP).

LAND PLOTS

Land Plots are player-owned and operated areas of the game with their ownership deferred from ERC 721 NFTs on the Ethereum Mainnet. Their specifics can be found in section 1.4 Land. These plots can be located in The Wilderness on the general world map, or within the instanced Capital or Large Cities of the game and are integral to the common player's progression and game experience. Each plot of land is owned and operated by an individual in the player community and represents a unique opportunity for the owner to gain materials or improve their gameplay experience and strength. While some common and early-game progression in crafting and specialization are available in NPC Areas, higher-level progression can only occur through player-owned buildings. Land Plots are just one of the ways in which players will shape the look, feel, and utility of the world of Forgotten Runiverse.

The plot attributes that take place in reserve calculation are further explained in section 1.6.2 Economic Inputs.





1.5

Land

Land Plots are a core part of the game experience. Across the entirety of the Runiverse, only 70,000 plots will ever exist. For plot owners, each plot works as a resource accumulation pool where the value lies in the utilization bonus for one to many players. As other players interact with the land to gain resources or make use of buildings, the plot owner will gain a bonus of gold or resources for each interaction. Each plot can be uniquely identified by its size, location in the world and material deposits. The plot size determines the number and type of buildings that can be placed on plots to provide value to the player community and owner, as well as the scale of material deposits it could hold. Beneath the very soil of each plot of land lies Materials whose type and abundance are dictated by the plot's size and location within the world. Below is a breakout of the types of plots available in the Runiverse.

				
Homestead	Settlement	Village	Town	City
Size: 8x8	Size: 16x16	Size: 32x32	Size: 64x64	Size: 128x128
52,500 Total in World	16,828 Total in World	560 Total in World	105 Total in World	7 Total in World

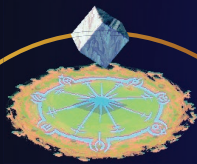
1.5.1

Land Uses

As a virtual real estate system, plot owners will be able to earn from their plots either passively by assigning usage rights or actively through taking steps to improve and manage land to benefit the broader game community.

Passive yield from plots is possible by granting building rights to other players, though this form of bonus will generally be lower than from active management and improvement of a plot. Plot owners have the absolute freedom in decision-making when it comes to which permits are granted in the plot, to whom, and at what price.

A plot owner may improve their return by actively managing their land and using it to add value to the broader community in four ways:



Community Resources: Gathering Stations

Upgradeable buildings that allow Players to extract Materials from a Plot's Reserve



Community Progression: Service Buildings

Upgradeable specialized buildings that are vital to Item Creation, Player Progression, and Trading purposes.



Travel Network: City Stones

Large Structures which connect the Plot to the World's Fast Travel System.



Personal Expression and Utility: Houses

These buildings allow players to store items and express themselves through customization and decoration.



Social Hubs: Guild Halls

Upgradeable buildings that serve as hubs for socializing and commerce while granting their members special benefits.

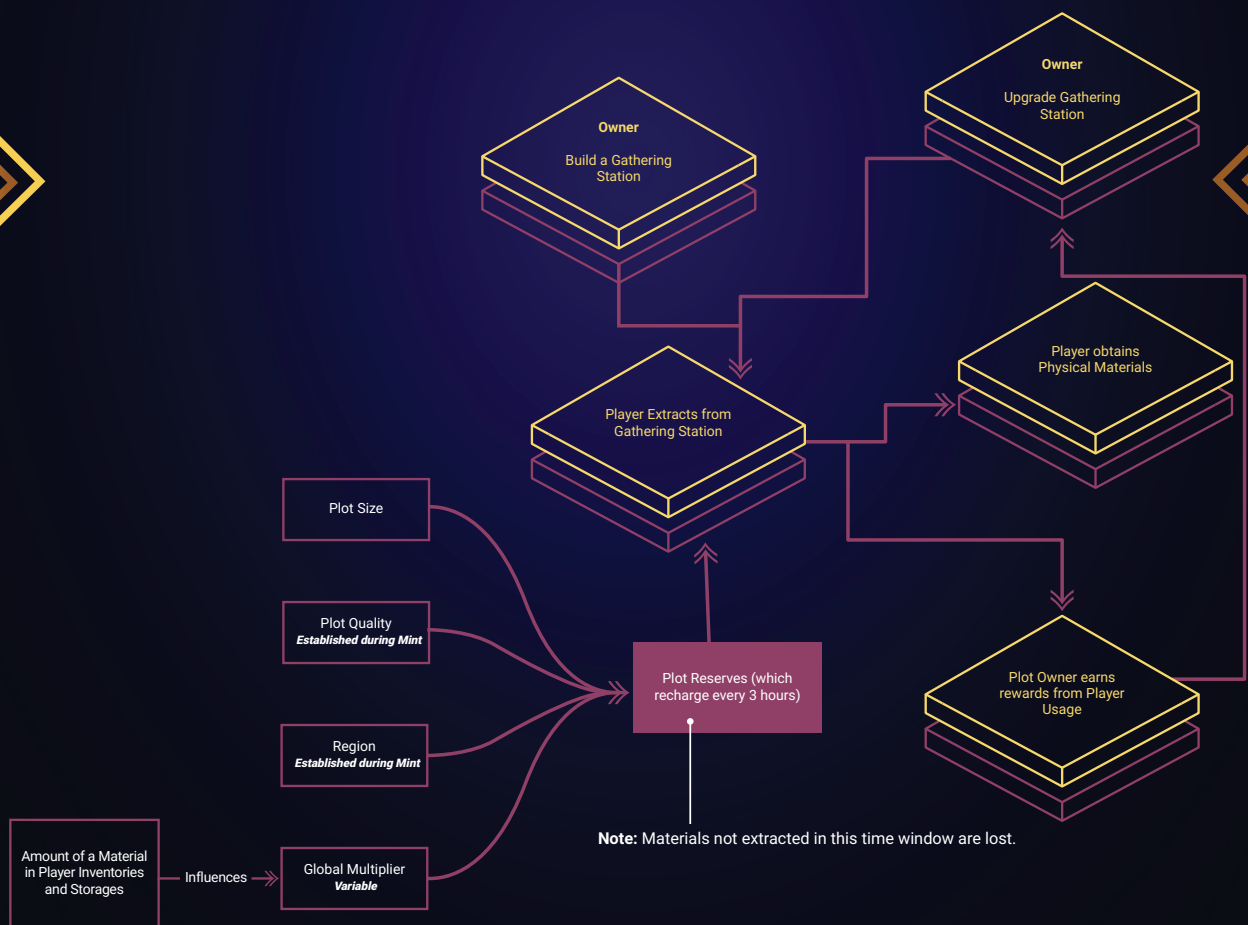
As with any other in-game asset, buildings can be minted to the Blockchain. One important difference between buildings and other in-game items is that while in-game items generally will only exist within a player's control in their inventory (sometimes represented as equipped items on a player's character) or storage, buildings are generally

erected in plot areas which may be under the control and ownership of other players. To manage this physical constraint, buildings can be converted into Miniatures and saved into the Player's inventory. In this way, buildings are managed in the same way as any other item and minted into the Ethereum Blockchain.

The plot size also determines how many buildings can be on it. For example, the smallest plot size (8x8) can only accommodate a small gathering station. In this way, distinct plot sizes guarantee distinct yields for plot owners. The full extent of buildings that can be added to a plot can be found in the Appendix.

LAND MATERIAL DEPOSITS

Each plot of land can be upgraded with a Gathering Station to allow for the extraction of materials from the plot. The type and quantity of materials on the plot is determined by the Essence Strength of the plot (See 1.3 World) and the global multiplier. Generally, interaction with player-owned plots through Gathering Stations will be the most efficient way for players to gain physical materials (see Appendix for list of all world materials) in the game, and therefore makes plots and their deposits highly valuable components of the game economy. In order to encourage a symbiotic relationship between Owners and regular Players we have devised a system that rewards Owners according to how much their Plot/Gathering Station/Service building is used.



Every 3 hrs, the world calculates a reserve of each physical material in each plot and in each region. This reserve is dynamic and fluctuates over time to represent the supply and demand of each material. The way the world estimates a plot's Material reserve depends on the Plot's Size and Region and on two other values which are independent to the Plot;

Global Multiplier and Modulator.

- **Size:** The bigger a Plot is the larger its reserves. A Plot's reserve size is directly proportional to its value.
- **Region:** Each Region of the world has specific Material properties which are inherited by the Plots on it.
- **Global Multiplier:** A value that fluctuates depending on the scarcity/abundance of a resource in the Game's economy. Each Material has its own dynamic Global Multiplier (which affects that Material's abundance in the Wild and in Plots) and is determined by the supply and demand of the resource.
- **Modulator:** A value determined by Economy Design which helps fine tune how much Material influx there is.

MAXIMIZING LAND BONUSES

To maximize the resource bonus from a plot, the owner will need to take an active interest in the overall game state, economy, and the location of their plot within the world. Materials in the world will dynamically refresh as they are gathered and secondary market sales means demand will vary over time for each resource. A plot owner may find that at certain times it will be more beneficial to run a Gathering Station on their plot for scarce resources, while at other times, or in other locations, a centrally located plot may be better served acting as a service building for the broader community to use for crafting, hence earning the owner higher resource returns from the tax they gain from each crafted item. Similarly, being involved in an in-game Guild may further incentivize other players to make use of an owner's plot and further generate incremental returns for the owner while also benefiting their social group.

1.5.2

Land Sales and Distribution

Land in the Runiverse will be Minted on the Ethereum Mainnet and distributed to ensure a broad level of ownership across both private partnerships and throughout the community. Through a combination of direct land sales and transfers such as our Private Land Sale or Community Land Sales, and opportunities for the broader community to earn plots through events and engagement activities, we plan to make ownership of Runiverse Land an achievable goal for anyone who truly loves what we're building. Land can be considered to exist in four states:

1. **Unminted:** If a Land Plot is not included in the 'known' world yet, it can be considered to be 'unrevealed', i.e. it is not owned by any users, its location in the world is not known, and it is not yet minted onto the Blockchain.

2. **Minted: Revealed:** A Revealed Land Plot is fully owned by a user and exists within a currently playable location in the game, so all the unique properties are known such as the exact coordinate location in game and resource allocation. These plots can be sold, transferred, or used in-game.
3. **Minted: Allocated:** This is a special case for plots in the collection granted to our earliest supporters. If a Land Plot is Allocated, it has been minted to the Blockchain, but is restricted from being sold or transferred by the owner until it has vested. The unique properties of the Land Plot are not yet known such as its coordinate location in game or resource allocation. These Land Plots may exist within the currently playable map of the game, or in an as yet unrevealed location in the expansion map.
4. **Minted: Vested:** This is a special case for plots in the collection granted to our earliest supporters. A Vested Land Plot has been minted to the Blockchain and can be resold or traded by the owner. Depending on the release state of the game, the unique properties of the Plot may not yet be known such as the coordinate location in-game or exact distribution of resources. These Land Plots may be in an existing playable location in the game, or in an as-yet unrevealed area of the game and can therefore not be actively used in-game. Once their location in game is known, they can be considered Minted: Revealed.

1.5.3

Partner Land Sale

This initial sale of land occurred on April 13, 2022 with a small initial group of partners including **Dialectic, 776, WENEW (now part of Yuga Labs), Libertus Capital, Kenetic Capital, Placeholder, FutureCorp, 1confirmation, Fiskantes, Deeze, and Soby**. This sale consisted of 10,924 Land Plots as shown above in Fig. 2. These Land plots were minted and delivered to partners as Allocated Plots on January 20, 2023. To ensure a level of fairness with public sale owners, these plots vest (become transferable) on a linear 2-year schedule. Of these plots, 50% or 5,462 will exist in the initial "Open Beta" world map. Over the course of this vest, some plots will become Vested while others will be Revealed Plots.

Fig. 3: Distribution of Private Sale Land Plot Sizes

Homesteads	Settlement	Village	Town	City
7,457	3,304	131	31	1

Fig 4: Partner Land Allocation Across Game Release

Plot Release	Homesteads	Settlement	Village	Town	City	Total Plots
Initial Open Beta Release (50%)	3,729	1,652	66	16	1	5,464
Total Land Allocated	7,457	3,304	131	31	1	10,924

1.5.4

Community Land Ownership

We view the decentralized ownership of land as integral to a healthy game experience and community. With that in mind, we plan to ensure that the community and engaged users are able to claim true ownership not only of their in-game items, but also of a significant portion of the Land available in the Runiverse. Our initial plan was to offer a public sale of land, but with the instability in the market since our private sale the team has determined that the best route forward is to begin by offering our most dedicated players and community members the opportunity to own Land by engaging with the gameplay experience. It is our goal to make sure that Land is useful for the entire community and not available exclusively to what traditional game publishers might call 'Whales'. With a finite amount of land available in the Runiverse and our plans to continue expanding the game world, there will continue to be future releases of Land which will be made available through Land Sales, community rewards, or gameplay rewards.

1.5.5

Bisonic-Retained Land

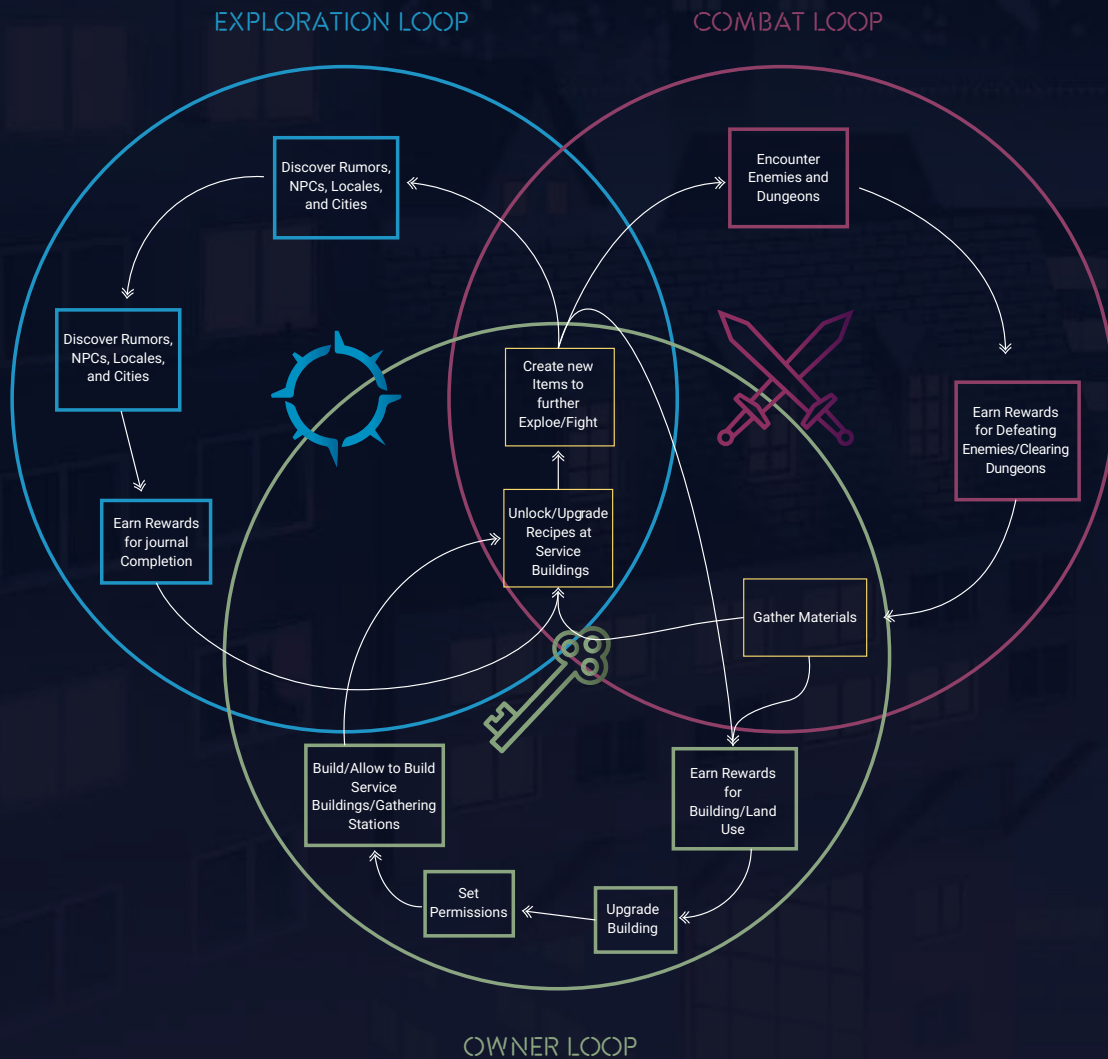
A portion of Land in Forgotten Runiverse will be minted and retained by Bisonic to grant to valued partners and for the Bisonic team. Our goal with this Land allocation is to align its use with positive incentive structures for the community and partnerships to benefit and enhance the overall game experience and player base.



1.6

Gameplay Loops and Systems

The Runiverse is built upon three interconnected gameplay loops (the Ownership Loop, the Combat/Gathering Loop and the Exploration Loop) which cater to different player types.



1.6.1

Combat/Gathering Loop



The Combat/Gathering Loop is the core loop of Forgotten Runiverse and will be the one most thoroughly experienced by players. Generally, players will engage in combat to earn rewards such as XP and recipes, then combine those recipes with materials they have gathered from the world in order to create new, more powerful items and to further improve their character before returning to combat with increasingly stronger enemies. This loop ensures that Players are constantly interacting with Buildings erected by owners as these quickly become fundamental to player progression as they are the most efficient way to gather materials, and are required to reach late-game character specializations and to craft higher-level gear.

COMBAT LOOP



As can be seen in the diagram above, there are three complete points of overlap between the Owner Loop and this one: Material Gathering, Unlocking and Upgrading Recipes and Creating Items.

Material Gathering. Though Players can find Physical Materials in the wild, Gathering Stations on Plots are by far the best way for Players to reliably find the resources they need, and also to find Rare Materials for end-game recipes.

Unlocking and Upgrading Recipes. When moving on from early game content, Players will require Service Buildings of a higher level to create the recipes they need to progress. Because of this, it is essential to the game's economy that Players use Buildings provided by Owners, and that Owners provide them to Players.

Item Creation. The creation of new Items is the final goal for Players in the Runiverse, be it a rare Decoration or a Weapon with amazing Stats, and as such it is vital that Buildings exist which can cater to the specific item needs of every type of Player—hence Plots.

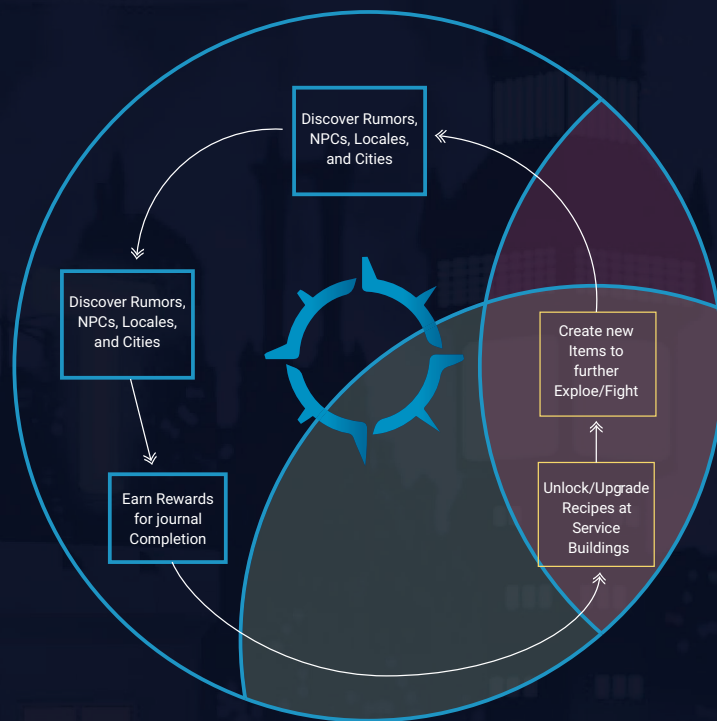
1.6.2

Exploration Loop



This loop is a core part of many MMO experiences and revolves around the Journal, the player's in-game record of what they've done, who they've met, and where they've been. Players will add entries to their Journal in a number of ways:

EXPLORATION LOOP



Quests: Known and experienced in-game as Rumors, Players will unlock and complete quests to learn more about the world and earn rewards by interacting with a wide-variety of NPCs and in-game locations.

Regions/Areas of Interest/Cities Discovery. Players are rewarded for discovering new areas. These include History Tidbits, Famous Characters, and more.

Other Journal Entries. Players unlock lore entries as they explore the world, complete quests, and talk to NPCs.

Players will also be able to complete Guild Quests and expand their Journal through collective endeavors.

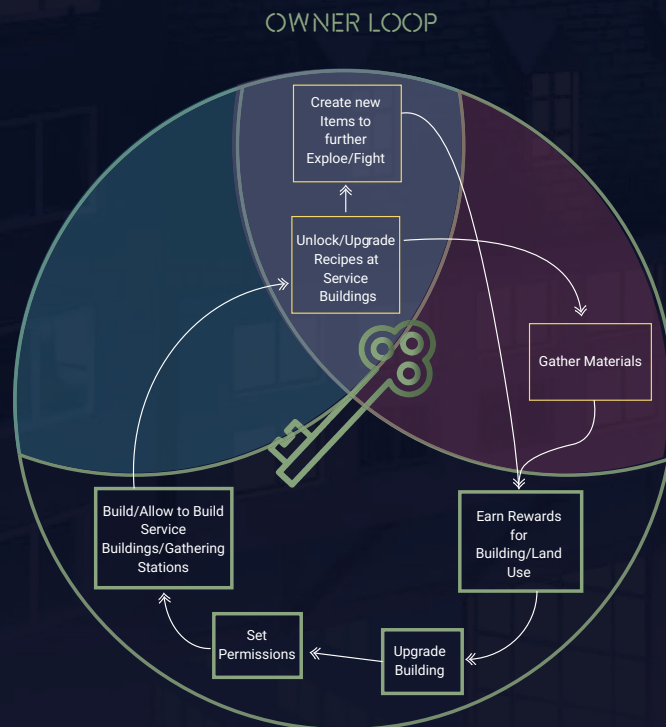
Furthermore, the game will encourage Players and Cult members to contribute to the world through a voting system which allows certain tales in the Book of Lore to become new NPCs and Rumors which will become part of the Journal.

1.6.3

Owner Loop



This loop is the loop that Plot and Building enthusiasts will be more concerned about and focuses on making Property a central part of gameplay as it intertwines with both exploration-driven and combat-driven players through:



Material Gathering. Building Gathering Stations are profitable for Owners or Players with building permits because it not only allows them to extract the Materials they need but it allows them to benefit from a reward system that tracks the extractions performed at the Station (by any player) and rewards the Owner accordingly.

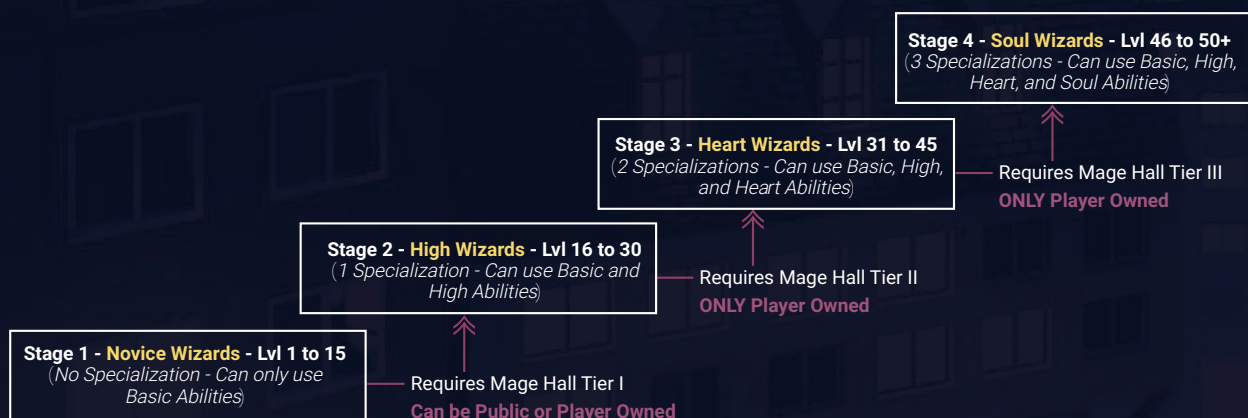
Item Creation. In the same vein of Gathering Stations, Service Buildings track Building usage and reward Owners accordingly. Players will need to make use of Player-owned buildings on Plots in order to access higher-level recipes and equipment.

Player Progression: Players will use Mage Halls (a service building available to Plot Owners and Players with Building Permits) to unlock Character Specializations. These Specializations are fundamental to Players and their progress throughout the Runiverse. Whenever a Player specializes, the owner of the Hall obtains a reward.

1.6.4

Player Progression Detail

Below you can find a diagram explaining the different stages of Player Progression and how they relate to Service Buildings (specifically Mage Halls) on Plots.



As you can see in the image above, Players must use Mage Halls built on Plots to reach the higher levels of play. Though Players can earn their first Specialization in Public Mage Halls (found in NPC Cities), only a limited pool of these is available in Public Mage Halls. Obtaining rarer ones requires unlocking it in a Player-Owned Hall.

1.6.5

Item Creation and Customization

At the heart of Forgotten Runiverse's gameplay loops are three Item Creation processes that ensure sustained gameplay and long-term engagement:



Enchanting: Enchanting allows Players to create Memory Crystals which they can equip to obtain Stat Bonuses and Abilities. The combination of (1) random generation (2) material color variety (3) the varying Stat ranges across Recipes, ensures that no two crystals are the same.

Forging. Forging allows Players to create Weapons, Body Gear, and Head Gear. As with Enchanting, the forging process produces a wide variety of gear: (1) Possible Item Bonuses depend on the Recipe chosen and on the Materials used to produce an item with random attributes within a defined range (2) colors of the Item created also depend on the Materials used.

Crafting: Decorations for player housing—everything from chairs to a candelabra—have a visual appearance determined by the materials used, ensuring that no two interiors look the same.

Every Item created in the game can be minted into the Ethereum Blockchain.

1.6.6

The Long-Term Adventure

Long term, it is important for Forgotten Runiverse to retain a significant portion of the player base while continuing to grow by bringing in new players. Therefore, our post-launch roadmap will include a consistent release of new content along with refinement of existing game content. As can be seen from other live-service products, a close relationship is necessary with the community to build a continually improving product while garnering the support of the player-base.

The amount and variety of Cult content provides a rich base for new story and gameplay content. Our team has a variety of content planned to keep even the most hardcore players engaged and satisfied for years to come. We'll be implementing content such as Endless Dungeons, world and story events, seasonal content and challenges, new game areas and item recipes, and leaderboard-driven tournaments to ensure every type of player has plenty of content to engage with.

Through all of these updates, player-owned plots will be an integral part of the release and engagement with new content by providing a stable location for the introduction of new resources, buildings, and player-created content.

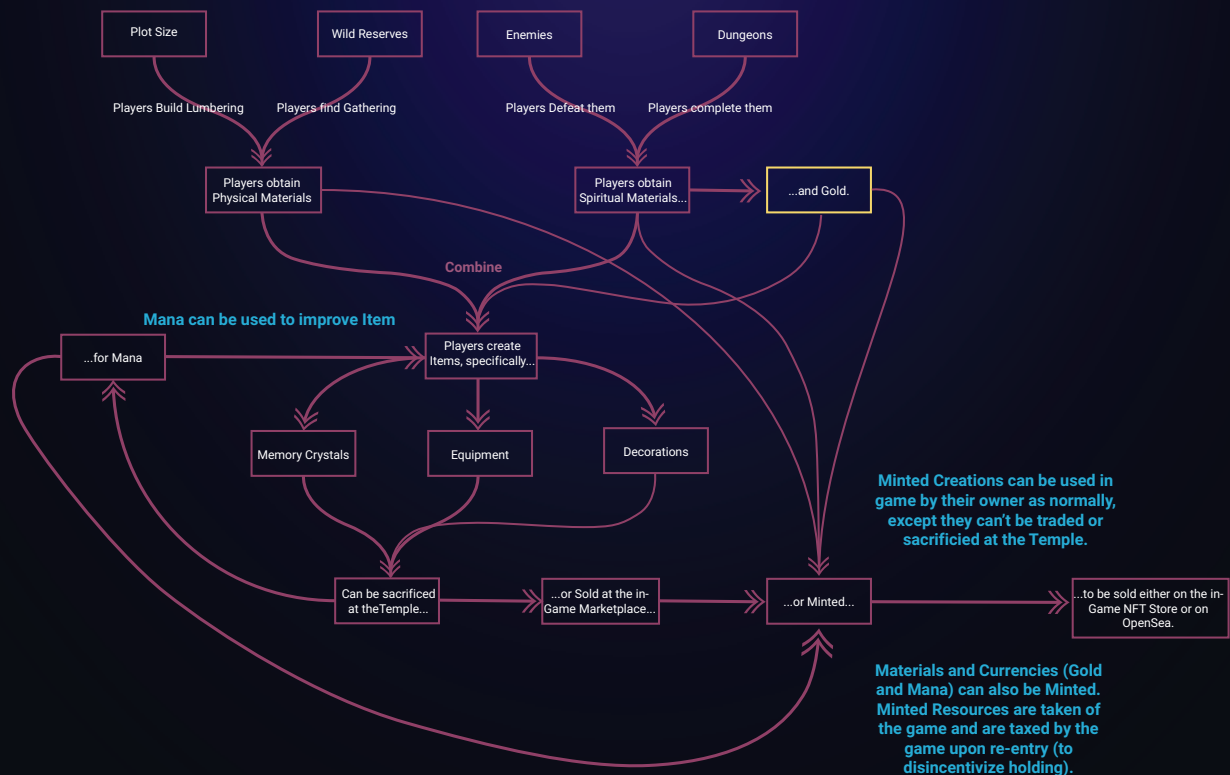




1.7

Game Economy

The game economy of Forgotten Runiverse uses a series of mechanisms to create a long-term balanced economy as well as to create long-term player incentives for players to strive for in order to play Forgotten Runiverse for years to come.



1.7.1

Game Economic Model

The economy of Forgotten Runiverse relies on a cycle of the input of economic components which are drained from the system by player activities as they improve their characters and plots to progress further into the game. These inputs and outlays are balanced by the game's economic model which measures the volume of inputs as well as their destruction through a system of incentives.

In Forgotten Runiverse, there are three components that will be used to make up all economic activity in the game: **Physical Materials**, **Spiritual Materials**, and **Currencies**. These components enter the game economy primarily through in-game player activities, but also to some degree from Marketing Promotional Activities.

Players will primarily accumulate component materials through in-game activities such as directly gathering from plot deposits or nodes found in the wild, by earning them as rewards for combat, or as rewards from completing quests or objectives. In order to keep the resources valuable, there is a Global Multiplier (GM) of each material in the game's economy; this GM fluctuates depending on the scarcity/abundance of the resource itself and is managed by the world.

1.7.2

Economic Inputs

The three primary component inputs for the economy are Physical Materials, Spiritual Materials, and Currencies, each of which will be gained by the player in different manners.

PHYSICAL MATERIALS

Gathering is the main way to obtain Basic and Rare Physical Materials. Gathering them can be done either in Gathering Nodes in the wilderness or in Gathering Stations on a Plot.

The game world's economy is naturally balanced and self-contained through a mechanism which independently manages the maximum amount of each material available to be harvested in the game world. This maximum amount is recalculated and applied at set intervals across the game world. This applies to both Plot resources where gathering stations provide access to the world's value of a certain resource as well as Gathering Nodes throughout the world which may or may not appear depending on a resource's availability in the economy.

The amount of resources entering the world obey a cycle where, per each time window of 3 hrs, the world re-starts their maximum capacity of each material generation also called reserve. This is, the world re-calculates a material's reserves by the demand and supply of each of them summarized on a global multiplier number.

PLOT DEPOSITS

The availability of a material deposit rules a world genetics design. Functionally, that means that once a plot is minted, it is created with attributes related to the biome it belongs to. To be specific, each element has a **deposit chance** to appear in the given plot and this existence lasts forever in the plot.

Once the deposit material is attached to the plot, there is an **essence strength** (Weakest, Weak, Normal, Strong and Strongest) related to them that determines how strong a material appears in the plot deposit.

The plot's maximum capacity to save an attached element depends on its size and is summarized on a **reserve multiplier** number. That means that if rewood appears in two plots of distinct sizes, the greatest one has a bigger scale of such material to store. Section 1.6.5 has an extended explanation of this.



At the beginning, the essence strength and the reserve multiplier together determine a capacity of extractions of a certain material in a given plot. This capacity of extractions per material can vary over time; that means the world controls how much materials enters the world in a time window by a global **multiplier number**.

Finally, the world includes a **Global Modulator** number, this is a value applied to the full capacity of extractions numbers and works as a scale number. Together, these four elements determine a maximum reserve capacity of extractions for each element.

An example of this value is shown on section 1.6.5

WILD NODES

Generation of resources in wild nodes works in a similar way to plot deposits except by the reserve multiplier that does not matter in the wildness. As a rule, there will always be more resources available from land plots than from wild nodes and finding a wild node in the same location is not always guaranteed.

Whenever a sufficient amount of Materials has leaked into a Sub-Biome/Special Area, a Gathering Node appears in a corresponding Spawn Point (chosen at random). The amount of Materials a Gathering Node needs before it spawns varies for each Material Type.

GATHERING STATIONS AND GATHERING NODES

The way to interact with the plot resources or the wild nodes is by the buildings' usage; gathering stations on plots or even gathering nodes in the wild. Gathering stations on plots have a maximum capacity of resources that increases when upgrading the station. Gathering stations can storage a percentage of the plot total resources and can pulled those resources in a highest rate, the full details are available in section 1.6.5

Gathering nodes in the wild are similar to gathering stations but have a disadvantage over the gathering stations and that is that they disappear. The full cycle is: Players can use Gathering Nodes by Interacting with them until they're depleted. When a Gathering Node is depleted it disappears and that Spawn Point is disabled for some seconds. Unused Gathering Nodes start decaying after a certain number of seconds. A decaying Gathering Node loses one Material per time period (this rate is determined by the Node's Capacity).

PHYSICAL MATERIAL RARITIES

Each material deposit can be laid with one of four classes of rarity: Normal, Rare, Cracked and Perfect. Once the player interacts with the material-gathering station on a plot deposit or with the nodes in the wilderness, he has a chance per each class of rarity, that means that the more extractions he does the higher the probability of having an extremely rare class of this material.

To understand this, let's take an example where the player has a woods gathering station playing on a single plot. Let's assume three types of wood deposits are attached to the plot: redwood, pine and olive. Once the player interacts with the gathering station, in each extraction, each element has a chance to appear, this chance depends on the reserve of such material stored in that plot, that means the more available extractions the higher probability to pick the material in a single extraction. Let's say Pine was the lucky one in that extraction, additionally, this one appears in one of four classes of rarity with a certain probability.

Rarity Class	Rarity Chance
Rare	0.05
Cracked	0.002
Perfect	0.002

SPIRITUAL MATERIALS

To gain Spiritual Materials, players engage in combat in dungeons or by encountering enemies. Both situations reward the player by their effort in a skill-based system.

Defeating a monster rewards the player with Spiritual Materials in an amount relative to the enemy's type and difficulty.

Players may also earn Spiritual Materials as a reward for completing quests or other in-game objectives.

CURRENCIES

Currencies are the central resources for trading among Players.

- **Gold:** Gold is the game's "catch-all" resource and Players can trade it freely amongst themselves. it can be obtained in Combat.
- **Mana:** Mana is a higher-tier resource that is obtained by Offering (i.e. breaking down)

1.7.3

Economic Sinks

Players are motivated to spend their available resources so that they can progress in the game and keep the value of their crafted items. In the Runiverse, there are four main actions that act as sinks, but many others will be added to the game in the future.

1. **Item Crafting is a sink for Spiritual and Physical Materials:**
 - a. Enchanting Gems with Spiritual Materials in a Mage Workshop allows the player to create Memory Crystals.
 - b. Crafting Physical and Spiritual Materials in an Atelier allows the player to create Decorations.
 - c. Forging Physical and Spiritual Materials in a Forge allows the player to create new Equipment.
2. **Building is a sink for Spiritual and Physical Materials:**
 - a. Plot Owners and Players with a Building Permit can commission buildings on Plots while other Players can contribute Materials or help speed up a building's construction.
3. **Building Upkeep is a sink for Gold:**
 - a. Building owners have to pay a monthly fee to the Builder's Guild to maintain their Buildings. Buildings that fail to pay this fee multiple times are forcefully miniaturized to ensure the land is actively in use.
4. **Item Offering (Destruction) at the Temple is a sink for Crafted Items**
 - a. Players will want the Mana produced from breaking down items to increase their chances of producing better crafted items, this means that crafting and breaking down crafted items to produce Mana acts as a further sink for Spiritual and Physical Material.

1.7.4

Value Exchange

Players will exchange and create value in the game through in-game actions and transactions, minting items to the blockchain and the changes they make to player owned plots.

DIRECT TRADING

Players may decide to trade directly with one another to acquire small sums of materials. This activity has a low transaction cost, but also is limited in the volume that players may trade.

MARKETPLACE; ON AND OFF CHAIN

Players may also sell items through an in-game marketplace. This marketplace enables Players to Mint specific Created Items or to Mint large volumes of Resources and trade

1.7.5

Economy Simulation

From now on, the yield of resources per plot will be measured in the number of available actions/extractions, the explanation will include one material case and the Forest biome scenario including all materials stored there. So, we use the number of available actions per plot in order to standardize the metrics.

Depending on the gathering station type, each action yields one to five items, for example, using a Ruby gathering station (Ruby belongs to Gems physical materials) a single extraction may give the player one ruby, while using a Oak gathering station (Oak belongs to Woods physical materials) a single extraction give the player 5 oaks. Each player with a gathering station can make 6 actions per minute.

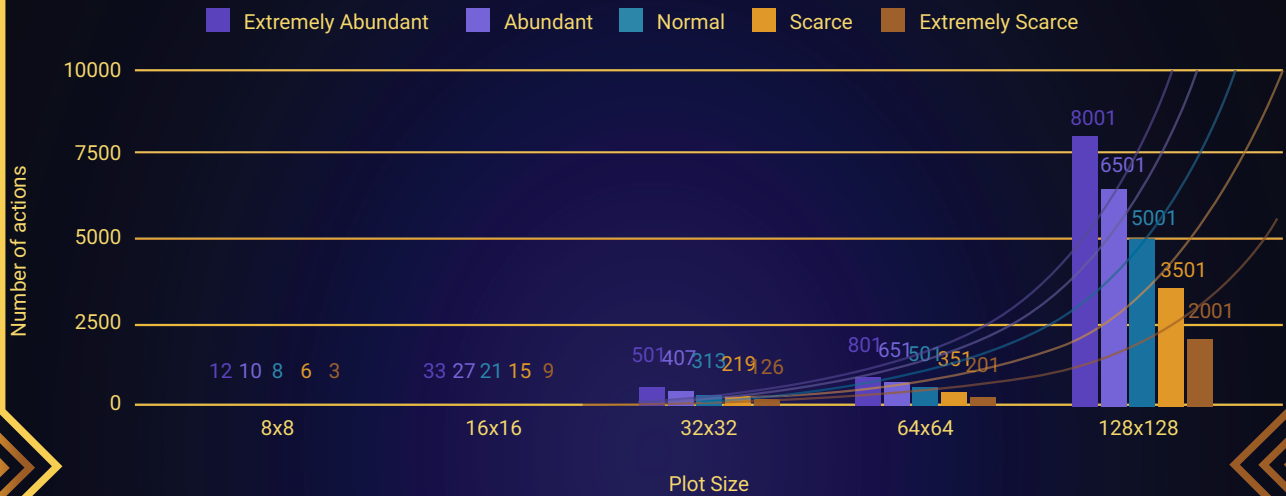
Family (Physical materials)	Yield per action/extraction
Woods and Stones	5
Fabrics and Metals	3
Gems and Elements	1

THE PLOT'S PHYSICAL MATERIALS RESERVE

Even when the plot total reserve varies each time window, addressed to a Global Multiplier by the scarcity or abundance of such material, at the beginning, the real yield of a physical material from one plot to another is determined basically by the reserve multiplier scale. The image below illustrates this behavior, the plot's yield increases exponentially when plot size does.

Plot's material yield by size in distinct global multiplier classification

Normal Material Essence Strength



UPGRADING STATIONS TRIGGERS AN INCREASE IN REAL YIELD

Once a gathering station building is placed to pull a resource from a plot, this can be upgraded from 1 to 3 tiers. Its maximum capacity is then addressed by its tier and size where both are summarized by a gathering station base capacity (Table below). The benefits of being placed in a bigger plot also increases the gathering station maximum capacity using the plot reserve multiplier.

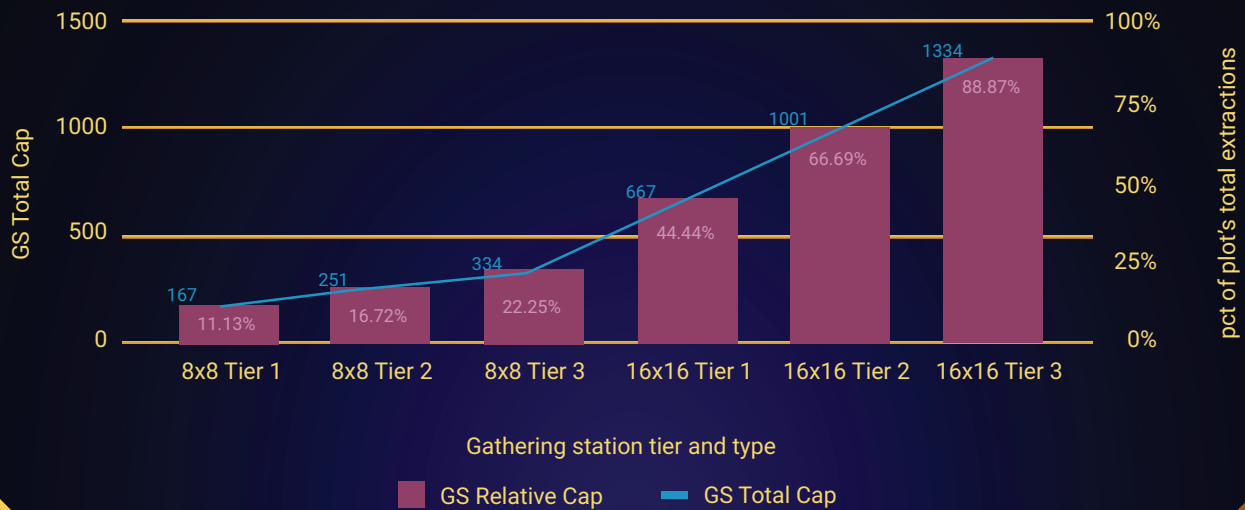
Gathering station	Base Capacity
8x8 Tier 1	4
8x8 Tier 2	6
8x8 Tier 3	8
16x16 Tier 1	16
16x16 Tier 2	24
16x16 Tier 3	32

Example: 32*32 plot size and a single gathering station

The 32x32 plot has a reserve multiplier of 41.67 units and when Extremely Abundant Global Multiplier and Normal Essence Strength then it has a total of 150 available extractions of one material in a time window. In order to compare the portion of the plot's total reserve that can be pulled by a gathering station, we take distinct types and sizes.

Portion of the plot's capacity (32x32 size) by GS

Comparing gathering stations types and sizes



For a single player who is using a unique gathering station by itself, upgrading its 8x8 gathering station from 1 to 2 tier must increase its earnings by 49.98% (33.37% upgrading tier 2 to tier 3). Upgrading a 16*16 gathering stations increases at least 4 times if we compare smallest vs biggest gathering stations for the same tier.

In terms of the time it takes to exhaust the full plot yield, we found that upgrading it reduces the time spent for a single player usage. The last shows that upgrading stations triggers an increase in real yields and decreases the time it takes to exhaust the total plot reserve.

Gathering Station	Base Capacity	Single Gathering Station Full Capacity	Minutes to exhaust the gs full cap	GS portion of the plot's total resources	Times G Station needs to be filled	Minutes G Station takes to exhaust plots reserves
8x8 Tier 1	4	144	24	11.13%	9	216.00
8x8 Tier 2	6	216	36	16.69%	5.9	212.40
8x8 Tier 3	8	288	48	22.26%	4.4	211.20
16x16 Tier 1	16	575	95.83333333	44.44%	2.2	210.83
16x16 Tier 2	24	863	143.8333333	66.69%	1.4	201.37
16x16 Tier 3	32	1150	191.6666667	88.87%	1	191.67

THE REAL YIELD SIMULATED ON A SINGLE BIOME

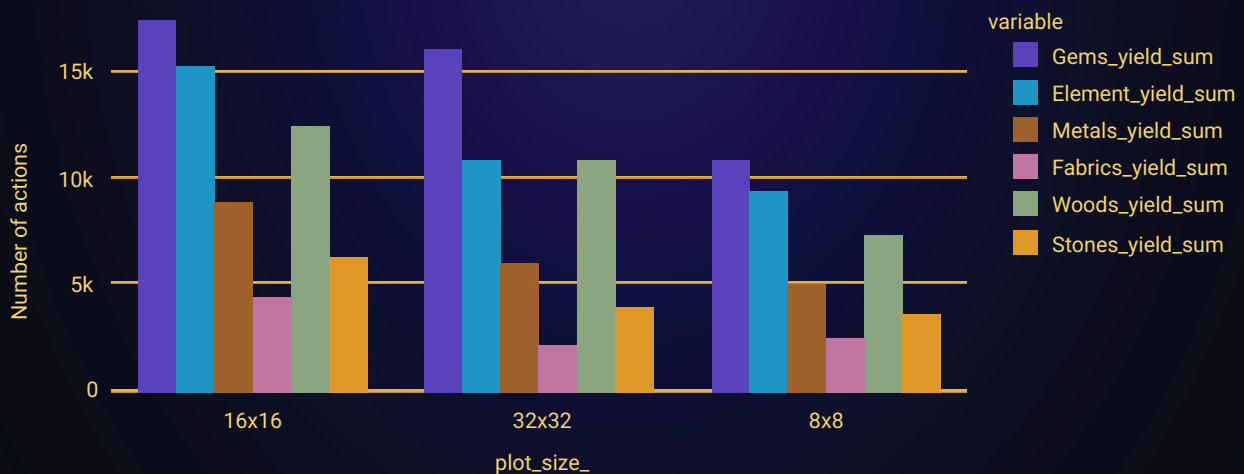
When a plot is minted into the ethereum block chain, it is placed in one to 10 existing biomes. This assignment also obeys a deposit chance, for each material, to be there; once the dice rolls, the lucky material shall always constitute part of the plot yield. For the same plot, the highest number of extractions of such material at the beginning will be determined by the essence strength of that material ruled by the biome.

To understand this, we use the Forest biome as an example. This biome is composed of three regions: North Ticket, Southern Ticket and Moon Island and the distribution of the 295 plots and the plot deposits numbers are explained in Appendix.

The average number of deposits, per material type, in each plot obeys the next distribution.

plot_size	Avg Gem	Avg Element	Avg Metals	Avg Fabrics	Avg Woods	Avg Stones
8x8	4	3	3	2	3	2
16x16	4	3	3	2	3	2
32x32	4	3	3	2	2	2

Using the last, and knowing each plot has distinct capacity of extractions per material deposit, then the distribution of real yield, comparing plot sizes, looks as follows.



Summary

	plot_size_	Gems_	Element_	Metals_	Fabrics_	Woods_	Stones_
0	16x16	17,408	15,254	8,869	4,387	12,383	6,241
1	32x32	10,751	16,095	5,938	2,063	10,751	3,875
2	8x8	9,460	10,720	2,522	10,720	7,257	3,555

As the global multiplier varies over time (each 3 hrs) and in consequence the total reserve changes, then it constitutes a control to manage the available amount of extractions of a specific material deposit. In order to show how the total resources entering the world changed by this fluctuation, we use the dashboard to show the Forest.

[Forest Biome / Dashboard](#)

THE RARITY OF MATERIALS

To understand the rarity chance of materials lets get a 32*32 plot size in forest as before. Let's assume the plot deposit is attached with three elements of Woods-deposits: Oak, Pine and Redwood, and the plot's maximum capacity of extractions for them is as follows.

Plot size	Woods Deposits	Number of Extractions
32x32	Oak	626
32x32	Pine	1563
32x32	Redwood	626

At the beginning, the chance to pull the element of interest in the first extraction, let's say Oak, is 0.22 and the chance to have a rarity class of this element rules the formula $0.22 \times [\text{Rarity Chance}]$. Once the player increases the number of extractions the rarity chance increases but the chance to have a specific element (Oak by the example) keeps near to the initial chance of 0.22.

The Cracked Chance is 0.002, and the probability to have 1 Cracked Oak in a number of trials increases when this number does. The table below illustrates this.

Number of trials/ extractions (N)	Probability to have 1 Cracked Oak in N trials	Probability to have 1 Perfect Oak in N trials
10	0.44%	0.044%
50	2.2%	0.22%
100	4.3%	0.44%
1,000	35.9%	4.35%
5,000	89.1%	19.93%
15,000	99.8%	48.68%
25,000	1	67.1%
50,000	1	89.18%

The full extended calculation can be found in the Appendix.



2.0

Blockchain Integration

Forgotten Runiverse uses Blockchain technology as a way to enhance the traditional MMORPG player experience, and provide players with additional value by allowing them true ownership of the things they create in game. By allowing players to mint anything in-game to the blockchain and incentivizing landowners to enhance their land to improve their returns, we aim to develop a true create to earn economy where the more value a player adds to the community, the more value a player will earn for themself.

All the in-game assets: material resources, currencies as gold, and in-game crafted items are not on chain by default. The minting process allows the player to store their belongings into the mainnet as an NFT which can then be traded, displayed, and allows for eventual interoperability with other projects or future projects by Bisonic and Magic Machine. As users learn the value of true ownership we expect them to naturally onboard to the creation of their own wallet.

The most efficient and rewarding way for a user to play Forgotten Runiverse will by necessity be for them to play 'on-chain' by minting and trading items on the Ethereum Network. In this way, we expect to be able to more easily scale the user base of Forgotten Runiverse, while also acting as an important first step for millions of players to blockchain technology.

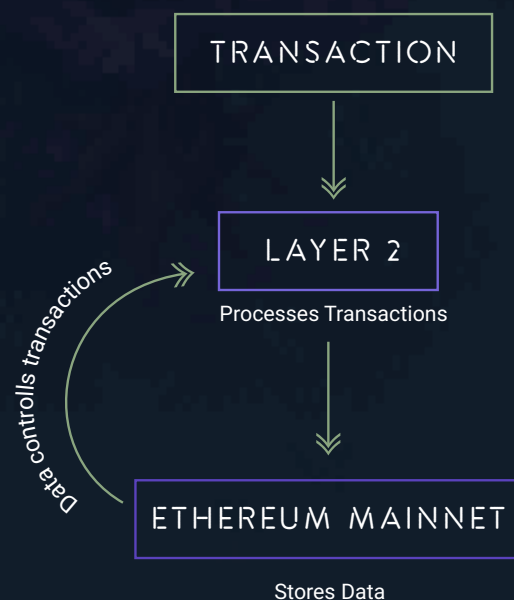


2.1

Layer 1 and Layer 2

We have chosen to connect Forgotten Runiverse with the Ethereum Network due to the ability of the network and its Layer 2s to provide real ownership to users, to scale transactions, provide transparency, and to operate on a trustless network.

Due to the cost and speed of transaction directly on Ethereum's network (commonly referred to as 'Layer 1') Forgotten Runiverse will make use of a Layer 2 partner to consolidate or 'rollup' bulk transactions before writing them to the Ethereum Network thereby reducing costs for users and allowing the game to efficiently scale on-chain operations.



For the purposes of Forgotten Runiverse, we use each network in the following way:

- **Ethereum Mainnet (Layer 1):** Land Plots exist as ERC-721 tokens, and all in-game transactions for Layer 2 are rolled up to post on Layer 1 ensuring that they inherit the security and benefits of Layer 1.
- **Layer 2:** All in-game item minting and transactions will occur on Layer 2.

As such an integral part of the game value chain for Forgotten Runiverse, it is very important for us to find the right Layer 2 partner to accomplish speed, trust, and low costs for users.

2.2

Minting and Trading

Everything players create in-game can be minted into the Ethereum Blockchain and are thus truly owned by them and maintaining their value and functionality in a guaranteed state. Minted objects can be traded on secondary markets or in-game through NPC buildings.

Due to the division between Layer 1 and Layer 2 for Plots and in-game items, we make use of two minting processes. Functionally, Plot minting lies directly to the mainnet and only requires that a user have a wallet with enough Ethereum to Mint the plot. Minting game items is done in-game and results in NFTs on Layer 2. Trading in-game items can be done by public sale in the Treasury building and free trade among other players.

To engage with minting and trading at scale, users will need to interact with the in-game Treasury building which functions as a marketplace and basic item storage for players.

1. **Minting Items:** Players may use the in-game Treasury to mint items to the blockchain. Once minted, an item cannot be destroyed, traded, or modified in-game. The item can still be used by the player while listed on secondary markets and if traded or sold on a secondary market, the item's in-game status will seamlessly update to reflect that ownership change. The owner may 'burn' the item on-chain to withdraw it fully back into the game and make the item able to be modified or traded in-game once again.
2. **Auctioning Items:** Users may post items for sale and allow other players to purchase them either at a stated price or a variable "auction" price. While listed for auction, items are not usable by the player.
3. **Item Storage:** Players can store a limited amount of in-game items at the Treasury.

Tokens and Collections

Forgotten Runiverse will make use of ERC721 and ERC1155 tokens for distinct items such as Land Plots or crafted items, and ERC-20 tokens for non-distinct items such as in-game currency or materials.

FORGOTTEN RUNIVERSE REAL ESTATE: AN ERC-721 COLLECTION

This collection refers to the Land Plots of Forgotten Runiverse and exists as a unique collection of ERC-721 Tokens on the Ethereum mainnet. Each token contains metadata information that conveys the plots relative size, location, biome, and resource deposits from the game. There is a 5% transaction fee when trading these tokens.

FORGOTTEN RUNIVERSE COMPONENTS: AN ERC-20 COLLECTION

This collection refers to the Component Items of Forgotten Runiverse - specifically Currencies, Spiritual Materials, and Physical Materials. Players will mint ERC-20 tokens for each piece of Gold, Wood, etc. that they wish to mint.

FORGOTTEN RUNIVERSE ITEMS: AN ERC-721 COLLECTION

Items minted from the game will be part of unique collections that may be divided depending on a number of factors such as unique in-game events, items related to specific sets, recipes, or item strength and quality.

FORGOTTEN RUNIVERSE COLLECTIBLES: AN ERC-721 COLLECTION

This collection refers to items minted that come from as collectibles from the game, for example, a badge granted to users who joined a specific event in-game, or who earn specific Journal Entries or achievements to be recognized.

Forgotten Runes Collections

Interoperability and Benefits

The impetus for Forgotten Runiverse was the deep and rich lore created by the Forgotten Runes community for the Forgotten Runes Wizards Cult NFT collection. As such, it is only natural that this collection would make use of the blockchain's interoperability and allow Wizard holders and other Forgotten Collection in-game benefits.

For Wizard holders, a number of benefits can be expected:

1. **Collective Bonus:** As the core group making this game possible we plan to allow Wizard holders to benefit from the game's growth and engagement. Wizards will have access to build a unique building on any plot they own that will tap into the Runiverse's growth and grant the holder a portion of the gold extracted from the world by the player base at large.
2. **In-Game Character:** By connecting a wallet that holds a Forgotten Runes Wizard, the player may use that character in-game, allowing them a unique visual appearance within the world.
3. **The Wizard Guild:** Wizard holders will have access to a unique guild that allows them to easily connect and play with other Wizard holders, share resources, and earn rewards.
4. **The Secret Tower:** Wizard holders will be granted access to the Secret Tower, a secret in-game location that will offer unique activities and the ability to directly participate in guiding the direction of the game.
5. **Lore:** As the game world expands, Lore written by Wizard holders will be first in line to be added to the game. By using the Secret Tower, Wizard holders will also be able to influence which specific lore, enemies, and items are brought in-game from the Book of Lore.
6. **Landmark:** Wizard holders will be granted an in-game decoration item that will allow them to clearly identify any plot of land they own as a Wizard-owned land plot.

The subsequent Forgotten Runes Warriors Guild, Ponies, and Beasts collections are also among our top priorities for in-game integrations and benefits, though those integrations and benefits are beyond the scope of this paper.

Land Benefits: Forgotten Runes Wizards, Warriors, Ponies, and Beasts are important supporters of this project, and as such we will ensure that all holders have the opportunity to earn or purchase Land within the Runiverse.





3.0

Appendix

Once the player is involved in the game, they can choose their own strategy to upgrade their stats. World assets such as Currencies and Materials can be used for trade.

LIST OF MATERIALS AND CURRENCIES

Players will come across two categories of Collectable Resources: Materials, which can either be Physical or Spiritual, and Currencies, which are divided into Regular and Premium.

Materials (Physical and Spiritual) can be crafted into increasingly rarer assets and used for exchange to level up. There is a free trade system among players managed in the Treasury building that allows Players to benefit from their crafted or minted items.

Physical Materials are divided into six families (Woods, Stones, Metals, Fabrics, Gems, and Elements) which each have a number of subtypes (for example Redwood, Willow, and Oak are all Woods).

Each Material is linked to a certain Wizard Color and has unique impacts on game loops by influencing the stats, properties, and effects of items crafted using them as components.

Color	Wood	Metal	Stone	Gems	Fabrics	Elements
Red	Redwood	Zink	Basalt	Ruby	Hemp	Sulfur
Brown	Oak	Iron	Granite	Smoky Quartz	Jute	Calcium
Yellow	Olive	Copper	Sand	Topaz	Flax	Nitrogen
Green	Willow	Tine	Limestone	Emerald	Cotton	Carbon
Blue	Pine	Tungsten	Shale	Sapphire	Silk	Antimony
Purple	Ash	Aluminum	Marble	Amethyst	Cashmere	Silicon
White	Holly	Titanium	Alabaster	Diamond	Wool	Hydrogen

Note: Metals can be converted into stronger Alloys in an upgraded Forge (e.g. Bronze and Steel).

Spiritual Materials are the most common Item Drop in combat and depend on the Enemy Family of the Creature that drops them. Rare Enemies drop uniquely named Spiritual Materials.

Regular Currencies are Currencies that can be found by participating in game activities. Gold, which is the most common, is used across many game activities, including building and item creation. Mana, on the other hand, has a more “specialized” use for Enchanting and Forging.

Premium Currencies are Currencies that can only be obtained by spending real money. Quantum Marks, our starting Premium Currency, will allow Players to purchase exclusive cosmetic Items, be it Mounts, Item Styles, or Building Styles.

CURRENTLY PLANNED BUILDINGS

Materials and Currencies are used for exchange and crafting new items. One of the main crafting items are buildings. In the Runiverse virtual world, buildings are physical spaces where players can save items and engage in certain activities.

Currently, the range of structures players can build is as follows. More will be added later.

Name	Description	Size
Player House	Buildings serving as storage.	Small House: 12x8 Medium House: 16x20
Mage Hall	Shared Building where Players can Specialize their Character.	14x16
Mage Workshop	Shared Building where Players can Enchant Memory Crystals (Abilities).	14x16
Atelier	Shared Building where Players can Craft Decorations.	14x16

- *Decimal format will look like: 49478023252739*

VESTING PROCESS FOR PLOTS

The vesting method restricts the Plots to be transferred to another wallet before a specific date. The date transfer is different for each Plot and is distributed uniformly based on the Global Id.

For example, if the total vesting duration is 100 days and there are a total of five minted Plots with vesting property, then each plot will unlock in the next days:

1. Plot with Global Id 1 will unlock in the day 20
2. Plot with Global Id 2 will unlock in the day 40
3. Plot with Global Id 3 will unlock in the day 60
4. Plot with Global Id 4 will unlock in the day 80
5. Plot with Global Id 5 will unlock in the day 100

In order to have a fair distribution, the minting order is randomized. A list of all desired individual mints is generated. Then, a [Fisher-Yates shuffle](#) is used to randomize the list. This algorithm makes sure that the probability is uniform and each mint has the same chance to be minted in a specific order.

A seeded uniform random generator number is used, so it is always a deterministic result.

PORTION OF THE PLOT'S AVAILABLE TOTAL EXTRACTIONS

Each plot has a maximum capacity of extractions per material and in consequence a maximum amount of material available to pull from the world. In the Gathering Stations case, the size and the improvement of their stats (from tier 1 to tier 3) allows the player to increase the yield of a given material.

Upgrading gathering stations for their usage in a given plot triggers an increase in real yield. On the other side, the gathering station base capacity changes by the plot's reserve multiplier that is by the plot size. As a consequence, upgrading a gathering station can not result in smaller plots exceeding yield of larger plots; the maximum capacity of a gathering station changes as its base capacity and the plot reserve does.

To show this, we suppose we are using a single material deposit type and there is only one player using the gathering station.

SUM of Single Gathering Station	Plot size				
Gathering Station	8x8	16x16	32x32	64x64	128x128
8x8 Tier 1	5	12	168	268	2668
8x8 Tier 2	7	18	252	402	4002
8x8 Tier 3	9	23	335	535	5335
16x16 Tier 1		45	668	1068	10668
16x16 Tier 2		67	1002	1602	16002
16x16 Tier 3		89	1335	2135	21335

The full extended example of this is described in the table below.

Plot size	Gathering station	Available extractions	Single Gathering Station Capacity	Single Gathering station portion of the plot's total resources	Installed number of players per gs	Number of extractions per player	Time to spend the entire gs extractions (hrs)
8x8	8x8 Tier 1	36	5	13.89%	1	36	6 mins
8x8	8x8 Tier 2	36	7	19.44%	2	18	3 mins
8x8	8x8 Tier 3	36	9	25.00%	3	12	2 mins
16x16	8x8 Tier 1	99	12	12.12%	4	24.75	4 mins
16x16	8x8 Tier 2	99	18	18.18%	8	12.375	2 mins
16x16	8x8 Tier 3	99	23	23.23%	12	8.25	1 mins
16x16	16x16 Tier 1	99	45	45.45%	4	24.75	4 mins
16x16	16x16 Tier 2	99	67	67.68%	6	16.5	2 mins
16x16	16x16 Tier 3	99	89	89.90%	8	12.375	2 mins
32x32	8x8 Tier 1	1501	168	11.19%	6	250.16666 67	41 mins
32x32	8x8 Tier 2	1501	252	16.79%	12	125.08333 33	20 mins
32x32	8x8 Tier 3	1501	335	22.32%	18	83.38888 89	13 mins
32x32	16x16 Tier 1	1501	668	44.50%	16	93.8125	15 mins
32x32	16x16 Tier 2	1501	1002	66.76%	24	62.541666 67	10 mins
32x32	16x16 Tier 3	1501	1335	88.94%	32	46.90625	7 mins

64x64	8x8 Tier 1	2401	268	11.16%	6	400.16666 67	1 hr 6 mins
64x64	8x8 Tier 2	2401	402	16.74%	12	200.08333 33	33 mins
64x64	8x8 Tier 3	2401	535	22.28%	18	133.38888 89	22 mins
64x64	16x16 Tier 1	2401	1068	44.48%	24	66.694444 44	16 mins
64x64	16x16 Tier 2	2401	1602	66.72%	36	50.020833 33	11 mins
64x64	16x16 Tier 3	2401	2135	88.92%	48	4000.1666 67	8 mins
128x128	8x8 Tier 1	24001	2668	11.12%	6	100.04166 67	11 hr 6 mins
128x128	8x8 Tier 2	24001	4002	16.67%	12	2000.0833 33	5 hr 33 mins
128x128	8x8 Tier 3	24001	5335	22.23%	18	1333.3888 89	3 hr 42 mins
128x128	16x16 Tier 1	24001	10668	44.45%	24	100.04166 67	2 hr 46 mins
128x128	16x16 Tier 2	24001	16002	66.67%	36	666.69444 44	1 hr 51 mins
128x128	16x16 Tier 3	24001	21335	88.89%	48	500.02083 33	1 hr 23 mins

THE FOREST BIOME: PLOTS DISTRIBUTION

Forest Biome is composed of 295 plots, distributed all by the Forest Regions. By the deposit chance of each material, we have a distribution of the total deposits.

Distribution of plots

plot_size	Number of plots			Total
	NorthTicket	SouthTicket	MoonIsland	
8x8	89	68	26	183
16x16	53	38	16	107
32x32	4	0	1	5

Distribution of the total deposits

plot_size	Gem Deposits	Element Deposits	Metal Deposits	Fabric Deposits	Wood Deposits	Stone Deposits
8x8	712	435	392	255	380	330
16x16	417	265	230	158	231	191
32x32	19	14	11	6	10	7

