

# Project Cygnus

Official Name TBD

Design Sheet

This Design Sheet is uncomprehensive to the full design of the game, as the game's design is a work in progress.

Please refer to [humans.md](#) for contributors to the project.

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## 1 Overview

### 1.1 Theme and Genre

Project Cygnus is an open-world explorative RPG with a strong focus on ability-based combat.

### 1.2 Gameplay Brief

**Explorative:** The player is free to roam a massive world. All choices they make as to where they go are up to them.

**Classless Roleplay:** Characters do not have classes scoping the player to a specific role in the game.

**Combat:** Players can use melee or ranged weapons asynchronously with abilities they obtain throughout the game. All aiming is done on the player's part through movement of the mouse. Melee and ranged attacks will act in the direction of the camera's forward vector.

**Abilities and Skills:** Abilities and Skills give the player an advantage in combat, applying certain effects to themselves or to their foes in order to overcome those enemies. Skills and Abilities are obtained overtime at the player's discretion. The player spends a resource "Souls" in order to obtain an ability or skill. Souls are obtained by completing objectives or quests, and

defeating important foes. The player may have up to 4 abilities active at a time, and 2 skills active at a time.

**Dungeons:** Dungeons are structures which are inhabited by a strict class of foes. Dungeons are a good source of protein, equipment, and Souls – every dungeon has at least one important enemy or boss monster!

### 1.3 Control Scheme and Platforms

The audience is initially expected to use keyboard and mouse;

**Movement:** Standard WASD SPACEBAR for motor movement and jumping.

**Abilities:** Activated via 1, 2, 3 and 4 for the hotbar's associated abilities.

**Platform:** Windows, OS X, Linux – Console Editions possible with appropriate controller support.

**Controller Support:** Planned, with a targeting system for aim assistance.

### 1.4 Influences

- CubeWorld
  - Indie OpenWorld RPG from Picroma.
  - The initial design of Project Cygnus was almost entirely copy-pasted from CubeWorld. The main things that have stayed mostly the same are the voxel-based environments and power-based leveling system.
- Diablo 3
  - ARPG Hack 'n Slash from Blizzard
  - Segregation of Passive and Active Skills
- Bloodborne
  - ARPG from FromSoftware
  - Shifting the focus of the game to combat; leveling up through the advancement of the player (purchasing levels via a resource).

## 2 The Project

### 2.1 Project Description

Inspired by the initial concept of CubeWorld and certain aspects of Bloodborne, Diablo, Minecraft, World of Warcraft and even Counter-Strike. Cygnus is a game intended to implement a new kind of RPG. An RPG without classes, skill trees, linear leveling, and complex item sets. The game will have a massive focus on skill based combat, invoking the player's ability to aim accurately with ranged weapons, or dodge and block precisely with melee weapon.

### 2.2 Unique

- Although heavily inspired by games like CubeWorld and Bloodborne, Cygnus introduces many new ideas to the genre such as an infinitely scalable and moddable tier-based Ability system.

- All core gameplay of Cygnus is deterministic and scalable via some pretty attractive math.
- The game itself ships with support for a community; massive modding support and tools to help users and modders manipulate the game.
- Big but open source.

## 2.3 Detailed Gameplay

- Equipment
  - Equipment are equippable items such as Armor, Lanterns, and Mounts or Pets.
  - Armor
    - All armor provides the player with boosts in stats, specifically the Armor stat.
    - All armor will increase the Armor stat and different pieces of armor affect different stats.
    - All armors have an associated Rarity which of course evaluates how hard it is to come by.
    - The rarity of the armor determines how much the armor affects the player's stats.
  - Lanterns are a specialized item which, when activated, generate light from the player's position. Effective specifically in darker areas and at night.
  - The player can equip a boat to traverse bodies of water quicker.
  - The player can ride pets that are mountable in order to traverse bodies of land quicker.
- Weapons
  - Melee weapons allow the player to block non-magic attacks.
  - Melee attacks deal instantaneous damage to enemies that collide with the weapon's hitbox.
  - Ranged weapons cannot block non-magic attacks.
  - Ranged weapons fire projectiles in the direction of the camera's forward. Projectiles deal damage upon collision with an enemy.
  - All weapons have an associated Rarity which of course evaluates how hard it is to come by.
  - The rarity of the weapon determines how much the weapon affects the player's stats.
- Crafting
  - Players may craft items at various workbenches or crafting tables.
  - Crafting requires the use of a recipe previously obtained and learned, as well as some resources found throughout the world.
  - Recipes will explicitly state whether they require a workbench, crafting table, forge or nothing at all.
- Cooking & Alchemy
  - Cooking & Alchemy can be done with or without a fireplace, depending on what the recipe in question calls for.
  - All recipes produce a consumable item that heals the player over certain periods of times when used.
- Item Rarity

- Rarity is an easily identifiable value of an item that essentially quantifies the item's quality and difficulty of obtaining it.
- There are several methods of logic that determine the rarity of an Item.
- If dropped by an NPC, then the rarity is determined via randomness.
  - Firstly, a distribution of probabilities of different rarities is determined via:
 
$$\omega(a, r) = \frac{D^r}{\sum_{i=0}^a D^i}$$
  - To proceed, a value between 0 and 1 is randomly generated, and is passed over the values created by  $\omega(a, r)$  until the generated value is in a range created by that function.
  - The rarity that is determined to by that random number is then assigned the dropped item.
- If the item is Crafted or Smelted, then the Rarity will be equal to the Rarity of the recipe used.
- If the item is spawned in a dungeon chest, then the NPC dropped method is used over the Dungeon's Boss.
- Souls
  - Souls are an obtainable resource in the world. The player may obtain souls by defeating important foes and completing quests or objectives.
  - The number of souls the player must spend in order to level up increases every time they spend more souls.
  - Objectives:
    - Completing an objective or a quest will grant the player some amount of Souls determined by the expected Power Level of the quest or objective.
    - An Expected Power Level is the average Power Level expected in order to complete a quest block or objective block.
  - Bosses and Important Foes:
    - Defeating and important enemy grants the player some amount of Souls determined by the foe's Power level and Augment level.
- Quests
  - Quests are groups of blocks called Quest Blocks or QBlocks. Quests can be single QBlocks or several. The player must complete every Block in a Quest in order to receive a reward.
  - A Quest Block is a singular objective expected of the player by the quest giver. Examples of Quest Blocks include:
    - Transport an item to another location
    - Defend an NPC for some amount of time
    - Assassinate an NPC
    - Infiltrate and steal an item from a dungeon without being noticed
- The Arena
  - The Arena is a channel separate from the game's main singleplayer and multiplayer gameplay.
  - In The Arena, players can challenge other players, take on hordes of enemies, take on a single massive Boss, or *all at once!* (not really, probably).

- Players can work in teams to take on other teams, or to take on NPCs including massive Bosses or dungeons.
- The following ideas for The Arena are experimental and may not actually be implemented:
  - *A ranking system for competitive play in all the different modes*
  - *A leaderboard for boasting to your friends and the rest of the world*
  - *Earning badges/medals or other unique – preferably aesthetic items – for your player*
- Abilities
  - Abilities are active conditions, triggered usually by the player when in combat.
  - Abilities are obtained by spending Souls at an NPC. The player may only obtain Abilities which are in a Tier they have access to.
  - Abilities typically create an effect such as magic damage, area of effects, buffs or debuffs, or even healing.
  - Abilities consume Magic from the player's Magic pool.
- Skills
  - A Skill is an Ability that is passive – triggered on frame or on an event or condition being completed.
  - Skills are obtained by spending Souls at an NPC. The player may only obtain Skills which are in a Tier they have access to.
  - Skills typically create conditions. As an example: *if the player's health is less than 40%, the player deals 10% more physical damage.*
- Rolling System
  - Player's obtain Abilities and Skills over time as they play the game more and more. The pool of abilities and skills they've obtained is called the Tree.
  - An Ability or Skill group is a type/class of abilities or skills. Every group has a specific purpose it intends to serve. As an example: Holy abilities might primarily heal targets, Fire abilities might primarily inflict strong damage over periods of time, etc.
  - The Tree segregates abilities and skills learned by Tier and Group.
  - The player may “lock in” abilities which appear in their Tree so that they will never lose them.
  - The player may only lock in a certain amount of abilities per tier. That number of lock-ins is related to the total number of abilities in that tier.
  - Every time the player dies, all abilities which haven't been locked in by the player will be replaced by a different random ability or skill from the same tier.
- Magic
  - The player has a pool of magic they can draw from to use abilities.
  - Magic regenerates over time.
  - Fire: More damage inflicted over a period of time.
  - Ice: Less damage that slows an enemy for a period of time.
- Pets
  - Pets are creatures which have been domesticated by the player.
  - Every creature which can be a pet can be domesticated by being fed a specific pet food.
  - All pets can fight for the player.

- Some pets are mountable, providing the player with a boost in movement speed over land.
- Stamina
  - A limited, regenerative resource that certain actions use.
  - Dodging and climbing both consume Stamina.
  - Certain weapons have moves which consume Stamina.
- Damage
  - There are two main types of damage: Physical and Magic
    - Physical damage is passed through the Armor stat of the receiving player or NPC.
    - Magic damage is passed through the Regi stat of the receiving player or NPC.
  - There are two main methods of receiving damage: Mechanical and Non-mechanical
    - Non-Mechanical damage is Physical or Magic damage which only passed through its respective resistance stat and that's it.
    - Mechanical damage is damage that is received through a non-direct method.
    - Mechanical damage example: Fire damage of magic or physical type is received over time. Ice damage is damage which slows you down.
- Player Stats
  - HP: The Player's maximum base health
  - Armor: The Player's resistance to physical damage
  - Resi: The Player's resistance to magic damage
  - Reg: The rate at which the Player's stamina regenerates
  - Stam: The maximum value that the Player's stamina can regen to
  - Power: A value between 0 and 101, tangentially representative of the player's level
  - Level: The number of abilities the player has obtained
- Races
  - An NPC or Player Race is a completely aesthetic feature that changes the character model of a player or NPC.
  - Planned Races include:
    - Human
    - Elf
    - Lizardmen
    - Frogmen
    - Dwarf
    - Goblins
    - Orcs
    - Undead
  - More will hopefully be added as the game is developed.
- NPCs
  - There are a range of kinds of NPCs. An NPC will be either Friendly, Neutral, or Hostile.
  - A Friendly NPC cannot be attacked, and can be interacted with. The majority of NPCs found in Towns or Cities will be friendly.
  - Neutral NPCs are NPCs which will not attack you immediately unless you provoke them – usually by attacking them.
  - Hostile NPCs are territorial. If you come near them, you will aggro them.

- NPCs boast a range of behaviors that varies drastically per NPC.
- Cities and Towns
  - There is a City at the center of every Major Region. Cities are massive collections of buildings and people. Cities are a good place to obtain quests and also gain reputation.
  - Cities have major districts for adventuring, trading, crafting and soultrading.
  - Towns are scattered about Major Regions. Towns are small, and typically do not have major districts. Usually, at most, a Town will have a few shops for materials and food.
- Dungeons
  - Dungeons are structures in the world which contain a singular Boss and **many** other enemies.
  - Players must fight through the different rooms of enemies in order to obtain the loot found throughout the Dungeon.
  - Defeating a Boss grants players plenty of Souls as well as some typically valuable loot.
  - There are a few types of dungeons: Standard, Special and Raid.
    - Standard dungeons are dungeons that don't have any special events and usually are not a part of a Quest Block.
    - Special dungeons are dungeons with scripted scenes and events. Typically, Special dungeons are part of Quest Blocks.
    - Raid dungeons are dungeons which, once entered, cannot be left until the player who wants to leave dies.
- Bosses
  - Bosses are very strong, large foes which pack a lot of punch.
  - Bosses always deal more damage, have much higher stats, and significantly more health than their normal NPC counterparts.
  - Bosses often drop much better loot than normal or even augmented NPCs.
- Leveling Up & Power
  - Power is a value that tangentially represents the player's level. Tangentially relative to the number of abilities that the player has obtained.
  - Power:
    - determines the tier of abilities the player may obtain.
    - restricts what armor and weapons the player may equip.
    - restricts what consumables and items the player may use.
  - A player can only level up by spending Souls to obtain a new Ability or Skill.
  - Leveling up increases Power, which is determined by the following equation:  $p(l) = \frac{2A}{\pi} \tan^{-1}(l * C)$ 
    - Where p is the power of the player.
    - Where l is the level of the player.
    - Where A is a constant between 0 and infinity, represents the value that  $p(\infty)$  returns.
    - Where C is a constant between 0 and 1 which changes the rate at which the player's power increases as their level increases.

- Power of an NPC is determined by the following equation:  $p(b, x, r) = b * (1 + (r + 2x) * C)$ 
  - Where p is the power of the NPC.
  - Where b is the power of the Boss of the Area that the NPC spawned in.
  - Where x is the distance between the NPC and the Area Boss's spawn.
  - Where r is the distance of the line drawn from the Boss's spawn, through the NPC, to an edge of the Area.
  - Where C is a constant between  $-\infty$  and  $\infty$  which manipulates the variability of the NPC's power.

## 3 Asset Pool

### 3.1 2D

Because the game actively relies on runtime-generated voxels which render via a vector shader, 2D assets will not be required for texturing any of the landscape or models.

A pool of sprites will be required for ability and skill icons, as well as move set/attack icons for weapons.

2D Art for the game's logos, icons and art.

### 3.2 3D

- Creature Models
  - Playable Races (Humans, Elves, etc)
  - Monsters
  - Other Creatures
- Buildings for Towns and Cities
- Flora such as plants, flowers, trees.
- World Space/The Map
- A large pool of Weapons and Equipment models for every class and rarity of armor or weapon.
  - Every class of armor or weapon will have a general model that each rarity derives from.

### 3.3 Animation

- All creature models must have animations for:
  - Running
  - Walking
  - Climbing
  - Rolling
  - Weapon Move Sets
    - Move Set Animations are shipped with content packs, not with the game. E.g. a weapon's move set animations come with the content pack that houses that weapon.
- Some Projectiles and Particle Systems may have their own animations.



## 3.4 Sounds

- Player footsteps
- Ambient world noise.
  - Birds chirping (day)
  - Crickets cricketing (night)
  - Owls hooting (night)
  - Leaves rustling (when near trees or in forests)
  - Waves crashing (when near oceans)
  - Water running or babbling (when near rivers)
- Creature death sound effect
  - Similar to that of CubeWorld's, maybe?
- Creature hit sound effect
  - Similar to CubeWorld's, maybe?
- Knockback and hard hit sound effect
  - Similar to CubeWorld's, maybe?