

# Fellowship Content Budgets (Strawman)

Owner: Matt Canei

Last Updated: 2/21/2025

## Overview

### THESE ARE STRAWMAN BUDGETS. USE WITH CAUTION!

This document is the source for all content budget-related information for Fellowship. It contains high-level guidelines as well as department breakdowns of performance targets. The prescribed budgets below are based on extensive testing on the Target Hardware. Should target hardware change during production, budgets will need adjusting.

The engine version, at the time of writing, could have a huge impact on performance and content budgets. Should engine updates provide large performance boosts, the budget doc will be updated.

**All targets are designed as general guidelines to achieve performance on-the-fly and reduce end of project quality purging.**

**There will always be exceptions. Any requests for breaking budgets should be discussed with Tech Art.**

## Target Hardware

[Target Hardware Philosophy](#)

### PC

Platform Name	GPU / VRAM	CPU	Memory	VRAM	Storage	Scalability Bucket
<b>PC - Recommended</b>	<b>NVIDIA RTX 4060</b>	<b>Intel Core i5-12400F</b>	<b>16GB</b>	<b>8GB</b>	<b>SSD</b>	<b>High (2)</b>
PC - Max	NVIDIA RTX 4080	TBD	32GB	12GB	SSD	Epic (3)
PC - Mid	NVIDIA RTX 1650	TBD	16GB	4GB	SSD	Medium (1)
PC - Low	Intel UHD / RTX 3050 Laptop	TBD	8GB	4GB	Space-Only	Low (0)
PC - Server	TBD	TBD	TBD	TBD	TBD	N/A

### Mobile

Platform Name	GPU / VRAM	CPU	Memory	VRAM	Storage	Scalability Bucket
<b>iPhone 15 (Mobile)</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>Low (0)</b>
iPhone 15 PRO (Mobile)	TBD	TBD	TBD	TBD	TBD	Medium (1)
Samsung Blah (Mobile)	TBD	TBD	TBD	TBD	TBD	Low (0)
Samsung Blah Pro (Mobile)	TBD	TBD	TBD	TBD	TBD	Medium (1)

### Console

Platform Name	GPU / VRAM	CPU	Memory	VRAM	Storage	Scalability Bucket
Sony PS 5	AMD RDNA2 (RTX 2070 eq.)	AMD Zen 2 (8-core)	16GB		SSD	High (2)

Platform Name	GPU / VRAM	CPU	Memory	VRAM	Storage	Scalability Bucket
Sony PS5 Pro	TBD	TBD	TBD	TBD	TBD	Epic (3)
Microsoft Xbox S-X	RDNA 2 52CU	AMD Xen 2 (8-core)	16GB	10GB	SSD	High (2)
Microsoft Xbox S-X (w/e Pros called)	TBD	TBD	TBD	TBD	TBD	Epic (3)

## Engine Version

Unreal Engine 5.4.3

## Visual Pillars

Project leadership has defined the following visual pillars as the top priorities for achieving desired quality targets. All departmental breakdowns are a result of these declarations:

- TBD

## Overall Content Targets

Scalability Bucket	FPS / Frame Time	Overall Tri Count	Draw Calls	Video Memory	Overall ENV Budget	Overall CHAR Budget	Overall FX Budget
Epic (3)	60FPS / 16.66ms	7 million	5000	12GB	5ms - 7ms	5 - 7ms	2ms - 5ms
<b>High (2) target spec</b>	<b>60FPS / 16.66ms</b>	<b>6 million</b>	<b>5000</b>	<b>8GB</b>	<b>5ms - 7ms</b>	<b>5 - 7ms</b>	<b>2ms - 5ms</b>
Medium (1)	60FPS / 16.66ms	5 million	3000	8GB	5ms - 7ms	5 - 7ms	2ms - 5ms
Low (0)	30FPS / 33.33ms	3 million	2000	4GB	10ms - 14ms	10ms - 14ms	4ms - 7ms
Mobile	30FPS / 33.33ms	3 million	2000	TBD	10ms - 14ms	10ms - 14ms	4ms - 7ms
Server	60FPS / 16.66ms	N/A		N/A			

## Overall Gameplay Targets

These are key metrics and constraints that most impacts Game Thread CPU.

Scalability Bucket	Total Enemy Count	Object Count (avg/frame)	Anim. GT Time (avg/frame)	Skeletal Mesh Comp Time (avg/frame)	Update Overlaps Time (avg/frame)	Max Scene Components (per BP)
Epic (3)	~36	10000	6.0ms	8.0ms	5.0ms	6
High (2)	~36	10000	6.0ms	8.0ms	5.0ms	6
Medium (1)	~36	5000	6.0ms	8.0ms	5.0ms	6
Mobile/Low (0)	TBD	5000	6.0ms	8.0ms	5.0ms	6
Server	~36	10000	8.0ms	8.0ms	5.0ms	6

[Enemy Count Methodology.](#)

## Gameplay Metric Glossary

- **Object Count:** The amount of objects being processed by the CPU (they can be processed separately in render thread and game thread for different purposes ie. rendering vs. components).
- **Anim GT (gamethread) Time:** The total sum average of anim game thread time averaged over a capture or series of frames. Indicative of bone count complexity, anim BP logic complexity or both.
- **SkeletalMesh Comp Time:** The total sum average of skeletalmesh component time averaged over a series of frames. Indicative of movement update time, overlap/collision updates and thus influenced by physics bodies and skeletal triangles.
- **UpdateOverlaps Time:** The total sum average of UpdateOverlaps calls averaged over a series of frames. Indicative of collision complexity (skeletal geo and/or physics bodies).
- **Max Scene Components (per Blueprint):** The number of scene components allowed per Blueprint. These types of components trigger Child Transform updates and can increase the cost of SkeletalMeshComp Time and other CPU metrics.

## Departmental Content Budgets

The following section breaks down department-specific targets as engine-level Scalability buckets (that are re-used for different platform configurations) and by detailed asset type (ie. architecture vs. foliage).

### Environment / Lighting

#### High-Level Targets

Scalability Level	ENV Max Frame Time	ENV Tri Count	Max ENV Draw Calls	Max Shader Instructions	Max Dynamic Shadowed Lights (On-screen/overlapping)	Detail Mode / Material Quality Level
High (2)	5ms - 7ms (30-42%)	3.5 million	4000	TBD	3	High
Medium (1)	5ms - 7ms (30-42%)	2.5 million	3000	TBD	2	Medium
Low (0)	14ms - 16.66ms (42-50%)	1.5 million	1500	TBD	1	Low

#### Asset Targets

Assets types are broken into classifications and by the relative size of the asset. Sizes are relative to an average player size.

Asset Type	Small LOD0 Tri Count	Med LOD0 Tri Count	Large LOD0 Tri Count	Max Material Instructions	Max Texture Sizes
Hero	5000	15000	25000	400	4096 Albedo 2048 CRM Pack 2048 2nd Pack 4096 Normal
Architecture	1500	3000	10000	350	4096 Albedo 2048 CRM Pack 4096 Normal
Trees	1500	3000	10000	300	4096 Albedo 2048 RGB Pack 4096 Normal
Grass/Foliage	500	800	1500	200	2048 Albedo 1024 RGB Pack 2048 Normal

Asset Type	Small LOD0 Tri Count	Med LOD0 Tri Count	Large LOD0 Tri Count	Max Material Instructions	Max Texture Sizes
Cliffs	2000	5000	15000	200	4096 Albedo 2048 RGB Pack 4096 Normal
Rocks	500	1000	3000	200	4096 Albedo 2048 RGB Pack 4096 Normal
Props	500	1000	3000	150	2048 Albedo 1024 RGB Pack 2048 Normal

\*- Mobile may have a LOD bias to use a minimum LOD, like starting at LOD3 instead of LOD0, that is desired. Mobile tri count is more general and applies to all sizes.

## Environment General Guidelines

- TBD

## Character

### High-Level Targets

Scalability Level	CHAR Max Frame Time	Max Characters (On Screen)	Overall CHAR Tri Count	Max Material Instructions	Max Bone Count
High (3)	5ms - 7ms (30-42%)	~36	3.5 million	400	350
Medium (2)	5ms - 7ms (30-42%)	~36	2.5 million	300	350
Low (1)	14ms - 16.66ms (42-50%)	~20	1.5 million	200	200

### Asset Targets

Character Type	Standard LOD0 Tri Count	Giant LOD0 Tri Count	Max Bone Count	Max # On-Screen	Max Physics Bodies	Max Shader Instructions / Mat IDs	Max Texture Sizes
Guardian	150k	200k	350	4	30	400	4096 Albedo 4096 ARM Pack 2048 2nd Pac 4096 Normal
Boss	150k	200k	350	1	30	400	4096 Albedo 4096 ARM Pack 2048 2nd Pac 4096 Normal
Enemy / Story NPC	50k	75k	200	10	10	300	4096 Albedo 4096 ARM Pack 2048 2nd Pac 4096 Normal
Background NPC	30k	50k	100	10	5	300	4096 Albedo 4096 ARM Pack 2048 2nd Pac 4096 Normal

Character Type	Standard LOD0 Tri Count	Giant LOD0 Tri Count	Max Bone Count	Max # On-Screen	Max Physics Bodies	Max Shader Instructions / Mat IDs	Max Texture Sizes
Fodder	15k	20k	50	20	5	200	2048 Albedo 1024 RGB Par 2048 Normal

## Character General Guidelines

- **LODs:** Characters should always have LODs created when imported into the engine and submitted for others to work with. LODs should reduce triangles by  $\geq 50\%$  per level of the previous level.
- **Triangles:** Tri counts of characters directly impact how expensive per-object/dynamic shadows are. Avoid/limit sub-pixel geometry.
- **Material IDs:** Every material ID is an additional draw call which increases the cost of a character.
- **Textures:** Not all channels have to be the same size. Use the smallest size before degradation.
- **Materials:** Avoid redundant math (Power of 1, Multiply of 1, etc.). If an adjustment can be done to the texture/in Substance do it there.

## VFX

### High-Level Targets

Scalability Bucket	VFX Max Frame Time	Max VFX Draw Calls	Overall VFX Tri Count	Max Shader Instructions	Max Flipbooks/Cards (On Screen)	Max Sprites (On Screen)	Max Texture Size
High (3)	2ms - 5ms	1000	~100k	300	5 Flipbooks or 50 Cards	1,000	4096×4096
Medium (2)	2ms - 5ms	1000	~50k	200	3 Flipbooks or 25 Cards	500	4096×4096
Low (1)	4ms - 7ms	200	~15k	150	1 Flipbooks or 10 Cards	200	2048×2048

*Note: Flipbooks = large single card SubUV animations. Cards = mid-to-large sized particle cards (such as smoke or water mist). Sprites = small mesh or card emitters such as sparks, embers, etc.*

### Asset Targets

Asset Type	Max Mesh Emitter Tri Count	Max Sprites (On Screen)	Max Lifetime
Guardian Ability VFX	TBD	1000	3 seconds
Explosion/Burst VFX	TBD	500	2 seconds
Enemy VFX	TBD	500	1.5 seconds
Passive ENV VFX	TBD	100	Looping

### VFX General Guidelines

- **Draw Calls:** Emitters such as sparks/sprites can overload a scene very quickly. GPU emitters are not always more performant, they are meant for very small sprites with short lifetimes.
- **Lifetime & Spawn Rate/Burst Count:** These two settings impact performance greatly, especially for large cards. These modules should always have LODs created.
- **Overdraw:** Overdraw (overlapping sprites/cards) degrades performance faster than any other type of content in Unreal, avoid large card sizes/flipbooks with long lifetimes. Use particle cutouts to reduce negative space between the texture

alpha and card geometry. Use shader complexity view to preview overdraw: if pink/white are present there are too many cards.

- **Light Emitters:** Dynamic particle lights can be extremely expensive, especially if they cast shadows. They should be used with great restraint and with the smallest possible radii to achieve the desired (or approximated) look.

Target Hardware Philosophy.

Enemy Count Methodology.