



Cyclops DLC Asset Guidelines

Updated Jan 2024

Introduction

The purpose of this doc is to communicate the best practices for delivering assets to us for Cyclops. You can choose to follow all, some, or none of these guidelines.

Cyclops is built on Unreal Engine. We can accept assets that are already in Unreal or we can accept assets that are in Maya or FBX format. In general it is easier, faster, & cheaper, for us to deal with assets that are already in Unreal as there is usually less to do. However, there are additional requirements for the Unreal Mobile renderer that Cyclops uses which means that not all Unreal assets will go directly into Cyclops without some work. This is particularly true if you are sending Unreal Levels.

We can work with almost anything that you send us whether it's Unreal or Maya/FBX. However, if the assets are problematic we'll need to spend additional time cleaning up, optimizing, converting, etc. The more of these guidelines you can match before sending us the assets the easier, faster, and ultimately cheaper it'll be to create the Cyclops DLC file.

Need someone to create the assets or animate your scenes? The Third Floor is the world's leading visualization studio. We work on films & episodic, theme-park rides, and video games. We can model, texture, and animate any asset you might need. We can build environments, animate out blocking, or fully animated scenes. We can also process your photogrammetry. Please contact us about any creative services needs.

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General

In general, our process has 3 steps; prep, cook, & delivery. If we are working with Unreal assets we can sometimes skip the Prep process. The prep process starts in Maya, we make sure the asset is set up properly and perform any polygon or texture adjustments that are necessary. We then export the asset as an FBX file and bring it into Unreal. In Unreal we perform some additional set-up. Then we "cook" the asset(s) which is our tool for creating the DLC files. After we have created the DLC file we can deliver it to you in a number of ways.

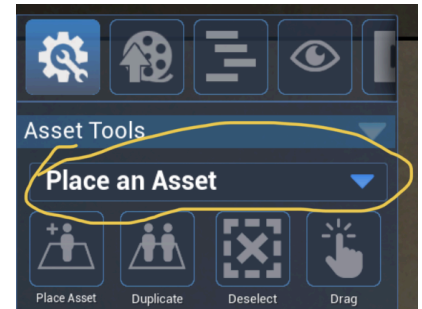
Cyclops Asset Types

In Cyclops, we break assets into 2 different types:

Placeable (Spawnable) Assets

These are any assets that you want to “place” into the world/scene/shot in Cyclops and then move or manipulate around in the real-world. This can include characters, creatures, vehicles, props, and set-dec. Placeable assets show up in the Asset pull-down menu in Cyclops and are added to the world with the Place Asset tool. You can add as many Placeable assets as you like. Placeable Assets can be loaded/placed in all Modes in Cyclops.

In Unreal terms, Placeables can be any Actor type including Static Mesh, Skeletal Mesh, and Blueprint Actor class. While a Placeable asset can be made up of multiple objects in UE, when Placeables are Placed into a scene in Cyclops they are treated as a single object.



Scene Assets

Cyclops Scene Assets are usually an entire scene or shot with multiple models, animation, lighting & FX. Scenes are used when you want to do set top-ups, set extensions, bluescreen replacements, animation that needs to be confined to a set, Virtual Camera previs scenes, or virtual scouting. You can only have 1 scene loaded at a time. Scene Assets show up in the Scene pull-down and are loaded with the Load Scene tool. Scene Assets can only be loaded from DLC files. Scene assets can not be loaded when you are in Asset Mode in Cyclops.



Scene Assets, as their name suggests, are an entire scene file as opposed to a single “actor”. Scene Assets can consist of many hundreds of individual models/assets. These are all treated separately when loaded into Cyclops. In Unreal terms, Scene Assets are Levels/Maps. They can include layers, sub-levels, & sequencer animation. Most things that can be placed into a Level in Unreal will work in Cyclops. See the section below for more detailed information.

Unreal Guidelines

We create Cyclops DLCs via our own proprietary Unreal Cyclops Cooker Plugin. So if you already have your assets in Unreal or are comfortable using Unreal then delivering your assets to us in Unreal is a great way to save on set-up time. However, in general, you should still make sure your Unreal assets conform to all the guidelines listed in the Maya/FBX section as the Unreal Mobile Renderer is not as powerful as the Desktop Renderer and the triangle and texture limits are lower on mobile.

Here is a list of Unreal features and their support in the Mobile Renderer.

FEATURE	SUPPORT
Nanite	No
Lumen	No
Landscape	Yes*
Foliage	Yes
Niagra/Cascade	Yes*
Blueprints	Yes
Animation (Sequencer and Blueprint)	Yes
Sub-levels & Sub-sequences	Yes
Alembic Cache	Yes
Cloth & Hair	No
Global Illumination	No
Depth of Field	No
Lighting	Limited*
Reflections	Limited*
Post Process Volumes	Limited*

Epic has a much more complete breakdown of the feature support on mobile.

Cyclops uses the Mobile Deferred Renderer. (middle column)

<https://docs.unrealengine.com/5.2/en-US/rendering-features-for-mobile-games-in-unreal-engine/>

Asset Types

First please read the section above about asset types in Unreal. There are two asset types in Cyclops, Placeable assets and Scenes.

Placeable assets can be any Unreal Actor class including Static Mesh, Skeletal Mesh, or Blueprint Actor class. You can have animated assets using Blueprint animation that triggers on BeginPlay. It is not possible to control BP animation inside of Cyclops.

Scene assets are Unreal levels. We can support most Unreal things that you can put into a Level including static/skeletal mesh, BP actors, lights, FX, fog, sub-levels, layers, & level sequences. You can have animated

scenes by using a Level Sequence. We only support one Level Sequence per Persistent Level. Level Sequence animation can be controlled inside of Cyclops.

Delivering Unreal Assets

To deliver Unreal assets you should use the Unreal Migrate feature to “migrate” the Unreal assets to a new project. You can read about the Asset Migrate tool here:

<https://docs.unrealengine.com/5.2/en-US/migrating-assets-in-unreal-engine/>

Also, this is a good video: https://www.youtube.com/watch?v=6krGT_eFyAI

The only difference is that, instead of migrating the assets to another UE project, you want to Migrate them to an empty folder named “content.” Once you have migrated everything you want there, then you can Zip up that folder and send it to us via Dropbox or WeTransfer or something like that.

Alternately you can deliver your entire Unreal project to us. However, please remove the following folders, if you have them, before sending us the project directory:

- Binaries
- Build
- DerivedDataCache
- Intermediate
- Platforms
- Releases
- Saved

General Notes:

- We currently support UE 5.2.
- Make sure your assets don't require ANY third-party or proprietary plugins.

Unreal Placeable Assets

As mentioned above, Placeable assets can be any Unreal Actor class including Static Mesh, Skeletal Mesh, or Blueprint Actor class.

Static Mesh

We recommend keeping the triangle count below 200k per actor.

For any static meshes with more than 50k triangles we recommend setting up LODs

If you have static meshes above 200k that we recommend setting up LODs and setting a minimum LOD that gets you a triangle count below 200k. You can also set per-platform LOD Minimums

Skeletal Actors

We recommend keeping the triangle count below 200k per actor

We recommend keep the bone count below 300.

You can have animated assets using Blueprint animation that triggers on BeginPlay. It is not possible to control BP animation inside of Cyclops.

Blueprint Actors

Avoid Blueprint actors with interactive runtime logic. OnTick and BeginPlay will work. But anything beyond that will likely not work as there is no way for the user to interact with the BP actors.

You can have animated assets using Blueprint animation that triggers on BeginPlay. It is not possible to control BP animation inside of Cyclops.

Materials & Textures

Cyclops supports most Unreal material types and operations. Cyclops supports various Blend Modes like Opaque, Masked, Translucent, Additive, etc. In general only the Default Lit Shading Model is supported. Two-sided materials are supported.

This doc from Epic lists support for specific material features in UE5. Cyclops uses the Mobile Deferred Renderer. (middle column)

<https://docs.unrealengine.com/5.2/en-US/rendering-features-for-mobile-games-in-unreal-engine/#materialfeatures>

Cyclops does not support textures larger than 4k. In general you should be using 1k & 2k textures. If you have lots of big textures you might need to use the Maximum Texture Size attribute to limit the texture size in memory.

Unreal Levels

General

You can set actors in your level to be Static or Moveable. Moveable assets will be moveable by the user in Cyclops.

Please organize your scene using the Layers in Unreal. Cyclops will copy the Unreal Layers including the visibility state of the Layer.

The total Triangle budget for your level will depend on the device that you are going to be using for Cyclops. We recommend being very conservative budgets in order to ensure a smooth experience in Cyclops.

- Triangles < 8 million
- Sum Tris < 15 million
- Texture Memory < 400 KB

Overall performance in Cyclops is a balance of different factors. This makes testing essential. Additionally, there is a Performance slider adjustment inside of Cyclops if you are having performance issues.

Lighting

Unfortunately the lighting features of Unreal available on iOS are more limited than desktop Unreal. Additionally complex lighting can easily overwhelm the mobile renderer. Because of this we usually have simple lighting in Cyclops scenes.

Mobile can use 1 directional light, 1 sky light and multiple spot lights, and point lights. You can not use rectangular lights.

There are two options for scene lighting in Cyclops:

- Realtime lighting which allows the user to adjust lighting direction and intensity in Cyclops, but is more limited in the number of lights and overall quality of the lighting that it can produce. You are only able to adjust a single directional light in Cyclops.
- Baked lighting which allows for many lights and higher quality lighting but is not adjustable inside of Cyclops.

Our recommended lighting setup is to use Realtime lighting with a single directional light and a skylight. Change both lights to "Moveable". This works very well for exterior scene but we often use it for interior scenes for its simplicity.

If you want more complex interior lighting you can mix Moveable, Static, and/or Stationary lights. However only the directional light can be adjusted in Cyclops. If you aren't using a directional light then you should probably bake all your lighting. Just be aware that with Baked lighting you need to make sure to not bake lighting onto actors that will be used for Holdout geometry.

Lighting is one of the trickier areas when it comes to mobile. It can be difficult to know exactly what the lighting will look like till you've loaded the scene onto your iOS device. As mentioned before, we usually opt for simple light to avoid a lot of interactions in attempt to get the lights "just right."

Epic offers additional info on Mobile lighting. Cyclops uses the Mobile Deferred Renderer. (middle column) <https://docs.unrealengine.com/5.2/en-US/rendering-features-for-mobile-games-in-unreal-engine/#lightypeandmobilityfeatures>

PPM

Cyclops has limited support for Unreal Post-Process Volumes. The main limitation or side-effect is that any adjustments made in a Post-Process Volume will get applied to the live video feed from your device. For example, if you use a PPV to boost the saturation of your CG scene then the live video from the camera will also have boosted saturation.

We think that this side-effect will be undesirable in most cases and recommend against using PPV to adjust the “look” of your scene. However, if you are creating a level for Vcam or Maps then this limitation would not be applicable..

Level Sequences

- Most everything that can be done in the Sequencer is supported in Cyclops.
- Camera and Camera Cut Tracks are not supported and should be removed.
- Sub-sequences are supported.
- Spawnable and Posable work nearly the same in Cyclops. However, the recommended workflow is to use Posable SM/SKM actors in the Sequencer
- Set the Sequencer In/Out points to what you want to play in Cyclops
- Cyclops can not play above 30 FPS.
- Cyclops only supports one Level Sequence per Persistent Level.

Misc

- **Fog** - Exponential Height Fog is the only Unreal Fog that will work in Cyclops. The user will be able to adjust the Fog Density & Fog Height Falloff inside of Cyclops.
- **FX** - Most Niagara and cascade effects will work in Cyclops. However you need to avoid FXs that spawn lights as they will overwhelm the mobile processor.
- **Sky** - You can use the default engine BP_Sky_Sphere or you can use a sky dome static mesh. Please avoid custom Sky plugins like Goodsky & Ultra Dynamic Sky as they will usually not work well on Mobile.
- **Sublevel** are supported. However you need to make sure to set the Streaming Method to Always Loaded in the Levels window.
- **Holdout Geo** - If you have static mesh actors that you want to be used as holdout geometry please place them in a Layer called Holdout Geo.
- **Cameras** - Cyclops doesn't support Unreal camera. Please remove all cameras from your level
- **Landscape** is supported. However, you are limited to 3 textures per landscape component.
- **Foliage** is supported. Foliage works pretty well as the geometry is instance but you can easily get into performance issues with too much foliage in your level.
- **Player Start** - put a player start actor in the level in the location you want the user to start in when they load the level in Cyclops.
- **Bookmarks** - Cyclops can have multiple bookmark locations in the level. If you want bookmarks please place additional PlayerStart actors in the level and place name them the name you'd like for the bookmark in Cyclops. Then place all these PlayerStart actors into a **Bookmarks** folder in the Outliner.

Cooker License

If you are licensing our Cyclops Cooker Plugin then you should also refer to the **Cyclops Prepping an Unreal Level** doc for more details about setting up your level for cooking.

Maya/ & FBX Guidelines

These apply to all deliverables to TTF

- Files delivered as Maya Ascii 2019 or FBX or OBJ.
- Real-world scale. 1cm = 1cm.
- Y-up world space
- Each Placeable asset or shot should be in a separate file.

Asset Quality on iOS

As a general rule, iOS can not display 3D assets as nicely as they look on a PC or Mac. This is due to the GPU and shading language on iOS devices. This means that assets will often not look as good as they looked on your PC or Mac. While iPad Pro now has the M2 processor you can still not get the same quality of look that you can get on desktop.

Additionally, iOS devices have a lot less RAM memory than a PC or Mac. Different devices have different processors and amounts of RAM memory, so it's often hard to know how "heavy" of an asset can be loaded in Cyclops. In general, you want to make sure your assets are as optimized as possible. Maxing out the RAM in iOS will crash Cyclops.

Placeable Assets

Placeable assets can include things like characters, creatures, vehicles, props, set-dec, and even buildings. Placeable assets can be static or animated. If you want multiple poses for your assets please send each pose as a separate file.

Set-up

- Each placeable should be in its own file.
- Prefer FBX files
- The file should be named the way you'd like it to appear in the asset menu.
- The asset should be combined into a single mesh
- The asset should be at the origin
- The asset's "feet" or the spot that touches the ground should be 0 height
- The asset's pivot should be at 0,0,0.
- The asset should be facing in the negative Z direction
- If there is no animation then please remove any joints.

Geometry

- Recommended triangle count, less than 50k
- Max triangle count, less than 250k
- Recommend that you avoid two-sided geometry. If you need to use 2-sided geo, please let us know.
- Tris or Quads only, no N-gons, please.
- Avoid co-planar geometry

Textures

- Recommended 1 texture per asset

- Max number of textures, 5 per asset
- Textures in JPG or PNG format only
- No higher than 2k per texture file.
- Simple Lambert, Blinn, or Phong materials only
- Can use PBR materials/textures
- sRGB color space
- No UDIMs
- No overlapping UVs

Extra guidelines for animated assets

Placeable assets can only have a single animation on them. When the asset is placed in the scene the animation will immediately start playing and will loop continuously. If you wish to have multiple animations please send each animated asset as a separate file.

- The animation should start at frame 0
- The animation should be baked down to a single contiguous FK joint chain.
- The max joints per asset is 500.
- Geometry should be skinned directly to the joints.
- No IK handles, constraints, set-driven keys, expressions, etc.
- No blendshapes, clusters, lattices, wraps, or other types of deformers.

We do support Alembic cache animation. Please contact us about the guidelines for Alembics.

Scene Assets

Scene Assets by their very nature are more powerful and more complex than Placeable assets. You use Scene Assets when you want to have an entire scene or environment in Cyclops. This can include multiple animated objects, creatures, characters, etc. This means it's harder to give guidelines that will work in all instances.

One of the powerful features in Cyclops is the ability to line up a CG env to real-world objects, i.e. buildings, sets, etc. This is very useful for animated scenes where action should be taking place in a specific location in the real world as well as doing CG top-ups or extensions. For this type of scene, we usually have "proxy" geo that represents real-world objects. This proxy geo is often built from lidar or photogrammetry.

Set-up

- Each shot or env should be in its own file.
- Prefer Maya 2019 Ascii files
- The file should be named the way you'd like it to appear in the shot menu.
- Everything should be fully assembled in a single file. i.e. no file referencing
- If possible, please also send us character/creature "t-pose" files
- You can include a sky dome geo/texture or we can use a standard Unreal Sky

- It is a best practice to make sure the scene origin is in the main part of the environment. By default when you load the shot in Cyclops you will be at the origin.

Geometry

- The total triangle count for any single creature/character should be less than 100k
- The total triangle count for any single env model should be less than 700k
- The total triangle count for all assets in a shot should be less than 8 million
- Recommend that you avoid two-sided geometry. If you need to use 2-sided geo, please let us know.
- Tris or Quads only, no N-gons, please.
- Avoid co-planar geometry

Textures

- Textures for the creature/characters/env are ideal but not required. If there are no textures then the char/creature/env will just be simply shaded in a single color.
- Recommended 1 texture per mesh
- Max number of textures, 5 per mesh
- Textures in JPG or PNG format only
- Textures MUST be a power of 2 dimensions.
- Simple Lambert, Blinn, or Phong materials only
- Can use PBR materials/textures
- sRGB color space
- No UDIMs
- No overlapping UVs

Animation

- The animation should be baked down to a single contiguous FK joint chain per character, creature, etc.
- Max joints per asset, 500.
- Geometry should be skinned directly to the joints.
- No IK handles, constraints, set-driven keys, expressions, etc.
- No blendshapes, clusters, lattices, wraps, or other types of deformers.
- Alembics are supported. Please let us know if you need to use Alembics.

Lighting

Unfortunately the lighting features of Unreal available on iOS are more limited than the desktop version. Because of this we usually make the lighting in Cyclops scenes simple.

There are two options for scene lighting in Cyclops:

- Realtime lighting which allows the user to adjust lighting direction and intensity in Cyclops, but is more limited in the number of lights and overall quality of the lighting that it can produce.
- Baked lighting which allows for many lights and higher quality lighting but is not adjustable inside of Cyclops.

By default we will use Realtime lighting unless you specify differently

Exterior lighting:

- A single directional light
- We will place a UE skylight in the scene

Lidar/Photogrammetry geo

- Please name all lidar geo in the scene with the prefix “LIDAR_”
- The total triangle count for the entire Lidar geo should be less than 5 million.
- The lidar geo should ideally be broken up into 4-8 individual pieces.
 - All pieces should be arranged correctly in the same file.
 - Each piece should be less than 700k triangles
- Ideally, holes should be filled
- Textures are not used
- UVs are not needed

Display Layers

Cyclops support Display Layers. In general, we put the Lidar/Holdout geo into its own Display Layer and the Sky into its own layer. We will also put each character/creature into its own display layer. If you want additional display layer set-up the best procedure is to set those up as Visibility Layers in Maya.

Moveable Objects

By default objects in the shot are not moveable in Cyclops. However, if you'd like an object(s) to be moveable please suffix the name of the object with “_MOVEABLE”

Bookmarks

Cyclops can have multiple bookmarks in a shot. Bookmarks allow the user to quickly jump to the Bookmark location in the environment/scene. You can set bookmarks manually in Cyclops or you can have us put them in when we create the DLC.

You can specify bookmarks in the scene file(s) that you send to us by placing a simple cone primitive on its side in the scene where you want to have a bookmark. Please angle the “pointy” part of the cone in the direction you want the user to face when they use the bookmark in Cyclops. You can use a different object besides a cone, but cones are nice as they can convey directionality whereas something like a sphere or cube can not.

Please name the object “BOOKMARK_NAME”. The NAME part should be whatever you want the bookmark to be named in Cyclops. Bookmark names can be almost anything, but please don't use special characters. (e.g. !@#\$%^&*() ;:”’.,<>/?) Underscores and dashes and spaces are fine.

