

12.7 Game Engine - Performance

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Performance

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Introduction

When developing games, game engineers, software and hardware developers uses some tools to fine tune their games to specific platforms and operating systems, defining a basic usage scenario whereas the users would have the best possible experience with the game.

Most of these tools, are software tools available for the specific Game Engines whereas the games were being developed and will run.

Blender Game Engine also comes with some visual tools to fine tune the games being developed, so the game developers could test the best usage scenario and minimum software and hardware requirements to run the game.

In Blender, those tools are available at the *System* and *Display* tab of *Render* Context in the *Properties Window*. There are options for specific performance adjusts and measurements, ways to control the frame rate or the way the contents are rendered in Blender window (game viewport) while the game runs, as well as controls for maintainnig geometry allocated in graphic cards memory.

Blender Game Engine rendering system controls:

System - Controls for Scene rendering while the game is running.

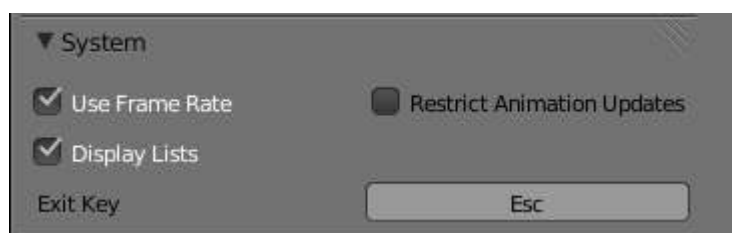
Blender Game Engine Performance measurements:

Display - Controls for showing specific data about performance while the game is running.

System

The *System* tab at the *Render* context of the *Properties* Window, let the game developer specify options about the system performance regarding to frame discards and restrictions about frame renderings, the key to stop the Blender Game Engine, and whether to maintain geometry in the internal memory of the Graphic card.

Options



System tab at the *Render* Context

Use Frame Rate

When checked, this will inform Blender whether to run freely without frame rate restrictions or not. The frame rate is specified at the *Display* tab of the *Render* Context of the *Properties* Window. For more information about frame rates, see the *Display* page.

Display Lists

When checked, this will tell Blender to maintain the lists of the meshes geometry allocated at the GPU memory. This can help to speed up viewport rendering during the game if you have enough GPU memory to allocate geometry and textures.

Restrict Animation Updates

When checked, this will force Blender game engine to discard frames (even at the middle of redrawing, sometimes causing *tearing* artifacts) if the rate of frame rendered by the GPU is greater than the specified at the *Display* Tab.

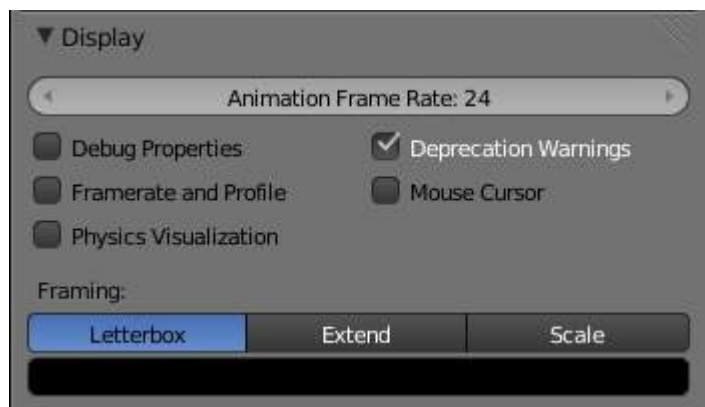
Exit Key

Clicking at this button will ask the user to type a key to specify a key to stop the game engine from running.

Display

The *Display* tab at the *Render* context of the *Properties* Window, let the game developer specify the maximum frame rate of the animations shown during the game execution, whether to see informations like framerate and profile, debug properties, physics geometry visualization, warnings, if the mouse cursor is shown during the game execution, and options to specify the framing style of the game to fit the window with the specified resolution.

Options



Display Tab at the Render Context

Animation Frame Rate

This numeric field/slider specify the maximum frame rate at which the game will run. Minimum is 1, maximum is 120.

Debug Properties

When checked, if a property was previously checked to be debugged during the game, the values of this property will be shown with the **Framerate** and **Profile** contents.

Framerate and Profile

When checked, this will show values for each of the calculations Blender is doing while the game is running, plus the properties marked to be debugged.

Physics visualization

Shows a visualization of physics bounds and interactions (like hulls and collision shapes), and their interaction.

Deprecation Warnings

Every time when the game developer uses a deprecated functionality (which in some cases are outdated or crippled OpenGL Graphic cards functions), the system will emit warnings about the deprecated function.

Mouse Cursor

Whether to show or not the mouse cursor when the game is running.

Framing

There are three types of framing available:

Letterbox

Show the entire viewport of the game in display window, using horizontal and/or vertical bars when needed.

Extend

Show the entire viewport of the game in display window, viewing more horizontally or vertically.

Scale

Stretch or Squeeze the viewport to fill the display window.

Color Bar

This will let the game developer choose the bar colors when using the **Letterbox** Framing mode.

Introduction

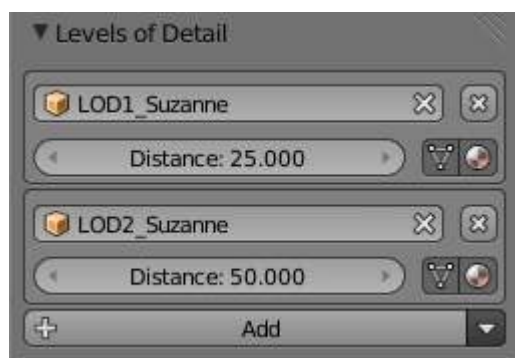
When creating visual assets it is often desirable to have a high amount of detail in the asset for up close viewing. However, this high amount of detail is wasted if the object is viewed from a distance, and brings down the scene's performance. To solve this, the asset can be swapped out at certain viewing distances. This is commonly referred to as a level of detail system. Each visual step of the asset is known as a level of detail. Levels of detail are most appropriate to use when you have a large scene where certain objects can be viewed both up close and from a distance.

Settings

Note

Modifiers on Level of Detail Objects

Any level of detail objects that have a modifier do not display correctly in the game engine. You will need to apply any modifiers for level of detail objects to appear correctly. A fix for this is being looked into.



Level of detail settings can be found in the Object settings when the renderer is set to Blender Game. In the Levels of Detail panel is a button to add a new level of detail to the current object. The settings for each level of detail is displayed in its own box. The exception to this is the base level of detail. This is automatically setup as the current object with a distance setting of 0. To remove a level of detail, click on the X button in the top right corner of the box of the level to be removed.

Object

The object to use for this level of detail.

Distance

The distance at which this level of detail becomes visible.

Use Mesh

When this option is enabled, the mesh from the level of detail object is used until a lower level of detail overrides it.

Use Material

When this option is enabled, the material from the level of detail object is used until a lower level of detail overrides it.

Tools

Some tools for making levels of detail easier to manage and create can be found from the drop down menu next to the add button in the Levels of Detail panel.

Set By Name

Searches the scene for specifically named objects and attempts to set them up as levels of detail on the currently selected object. The selected object must be the base level of detail (e.g. LOD0). This can be useful to quickly setup levels of detail on imported assets. In order to make use of this tool, your naming must be consistent, and each level must be prefixed or suffixed with “lodx” where x is the level that object is intended for. The case on “lod” must be consistent across all objects. Below are some example names that the tool will recognize.

- LOD0_Box, LOD1_Box, LOD2_Box
- Box.lod0, Box.lod1, Box.lod2
- LoD0box, LoD1box, LoD2box

Generate



This tool generates and sets up levels of details based on the selected object. Generation is done using the decimate modifier. Generation does not apply the modifier to allow further changing the settings. Generated objects are automatically named based on the level they are generated for. Below are some settings for the operator.

Count

The number of levels desired after generation. This operator creates Count - 1 new objects.

Target Size

The ratio setting for the decimate modifier on the last level of detail. The ratio settings for the other levels is determined by linear interpolation.

Package into Group

With this setting enabled the operator performs some extra tasks to make the asset ready for easy linking into a new file. The base object and all of its levels of detail are placed into a group based on the base object's name. Levels other than the base are hidden for both the viewport and rendering. This simplifies the appearance of the system and does not affect the appearance of the base object. Finally, all levels are parented to the base object to remove clutter from the outliner.

Clear All

Clears the level of detail settings from the current object.