

Introduction

The general methodology used to generate this data is to not look at the performance of a single instance of a Component, but to add more and more components and extract the formula for the performance from this data. For example: If we want to know how much frame time it costs to have one extra layer on an FX controller, we can have 1, 8, 64 and 256 layers, plot those on a graph, fit a line to this data, and use the formula of this line to see how much frame time it costs to add a single extra layer.

My goal is to test the performance of every single component that can be used in VRChat to give a rough estimate of how heavy they are to run compared to each other, to help the community choose more optimized methods to do things.

Throughout this article, I will give the results in ms of frame time. To interpret this, it is good to think about it like this:

If your goal is to have 90 fps, you have approximately 11 ms (so 0.011 seconds) to render each frame. This is your budget. Some of this time will be spent on PhysBones, some of it will be spent on Animators, some of it will be spent on Materials, etc. So if something takes 1 ms, you can see this as taking about 9.1% of your “budget”.

Do note that this frame time is used for processing every single avatar and the world, so if something on a single avatar takes 9.1% of the total budget, that is quite a lot, and should probably be a point of optimization.

To have 60 fps, your frame time budget is approximately 16 ms. To have 40 fps, your frame time budget is 25 ms.

The graphs used in this document are generated on a computer with the following specs

CPU: AMD Ryzen 7 5800X

Memory: DDR4 2x16GB 3200 MHz CL18

GPU: NVIDIA GeForce RTX 4090

The data used throughout this document is generated using
<https://github.com/jellejurre/UnityBenchmark>

Revision #1

Created 21 May 2023 13:28:48 by jellejurre

Updated 21 May 2023 13:31:52 by jellejurre