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GDC Talk

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Summary

I watched “LOD Techniques for Boosting Rendering Performance.” In the talk, Gustaf Johansson and Ulrik Lindahl explained LODs and why they can be extremely important for improving performance in a graphics pipeline. The talk covered how LODs work in general to improve fps. It also went over how different LODs can be used to maintain a bar of visual quality that will not interrupt a player’s immersion in a game.

They mentioned some major issues that occur when we don’t use LOD models. Without LODs, we are typically drawing many more triangles than we need to. On top of this, we are often drawing over triangles that have already been drawn. This results in using extra GPU time, but LODs help us get it back. LODs allow us to take some already created model and decompose into different LOD levels. The higher the LOD level, the less triangles and details the model will have. As a player gets further and further away from an object, we can replace that object’s model with higher LOD level models so the GPU doesn’t have to draw as many triangles. During the talk, they also mentioned another technique that can be used to improve fps. This involves using proxy LODs, which is the process of combining multiple meshes into one proxy mesh. Doing this allows us to perform one draw call on the proxy mesh instead of individual draw calls for each mesh within the proxy mesh. This idea can be taken even further by creating proxy meshes from proxy meshes.

The talk also covered techniques on how to switch to different LOD levels as a player’s distance from a mesh increases. The three techniques mentioned were static, geomorph, and blend switches. Static switching is the fastest of the three. It involves doing a direct replacement of the LOD model. Blending is more expensive. It involves drawing both the higher and lower level LODs and then blending the two together to get a more seamless transition. The best results occur when combining the geomorph and blending techniques. It is almost indistinguishable that the LOD switch is even occurring. They noted that the best option for the LOD switch type is dependent on whether the player will notice it or not. If the player is in a high action moment, just use static switching since it is the fastest and the player will most likely not notice it. If the

player is in a calmer environment, use blending since they will probably be focusing on the details more.

Questions

How do you deal with generating proxy meshes? Generating them during runtime seems like it would be rather expensive.

What is involved in the system that manages LOD switches? How can we quickly figure out the LOD switches that need to be performed during runtime?

Do you have any resources where we can go to learn how to implement these techniques?

Link

<https://www.gdcvault.com/play/1018085/LOD-Techniques-for-Boosting-Rendering>