

OPC Discussion

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The OPC group has a major problem that could render it as ineffective as the PLB group. The problem centers on object-space decimation of geometry in a display list -- what is *legal* according to the OpenGL specification.

Background

During the course of the last OPC submission (around 2/1/99), it was brought to the attention of just about everyone in the world that not all implementations were rendering the same number of vertices when the viewset was stored as a display list. In effect, different workloads were being measured.

This led to many questions about what is legal to do in a display list. For instance...

1. Is it legal to create multiple *level-of-detail* display lists and pick the appropriate level based on the scale? For example, a finely tessellated curve with 100 vertices might only have 50 vertices in the next display list *level*, 25 in the next level, 10 in the next level, and so forth. The data in question might be anti-aliased vector data.
2. Is it legal to remove interior, co-linear vertices in a line or line strip?
3. Is it legal to remove duplicate vertices in a line strip?
4. Is it legal to collapse a set of quads to a single quad if all of the normals are the same?
5. Does *immediate* mode rendering have to match *list* mode rendering?

Opinions

As with any group of people, opinions varied wildly -- from strict to broad....

1. "All vertices in a display list must be processed -- nothing can be removed."
2. "If the vertex has no effect (duplicate vertices in a line strip), it can be removed; everything else must be processed."
3. "Enough of the vertices must be processed to correctly display the model."
4. "As long as the final image on the screen is correct, how it got there is not open for discussion."

Some vendors suggest that removing vertices in an over-tessellated, anti-aliased line strip renders a better quality image. Others suggest playing an AVI file of pre-rendered images should meet the test criteria. (I think this was shot down because of bandwidth issues.)

An argument against removing anything is that if everyone is not doing the same workload, comparisons between graphics cards are not possible. The viewperf metrics do not penalize the implementation for the time it takes to build the display list. Therefore, spending more time and memory to do elaborate decimation of the viewset is free. With a real application, build time and space is an issue.

Finally, if the bar is allowed to be lowered for decimation reasons, how low should it go. "Good-enough" is a slippery thing.

Discussion

A couple of the companies asked that the ARB make a statement concerning the intent of the OpenGL specification with respect to display list decimation. I think it would be beneficial for us to discuss the following topics:

1. Is it legal to skip processing of vertices in a display list based on some TBD criteria. If so, what is the criteria?
2. Is the *immediate* mode image expected to match the *list* mode image? When does invariance apply?
3. Should the ARB tighten up the definition of an OpenGL-compliant implementation?

Or, the ARB could move on to the next agenda item and stay really far away from this can of worms...

Comments?