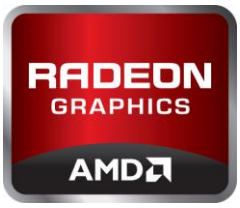



# SilhouetteTessellation11

AMD Developer Relations

## Overview

This sample presents two techniques for achieving smooth surfaces from the position and normal data of a low density mesh. It utilizes Direct3D 11 APIs and hardware to make use of the new tessellation stages of the pipeline.

The two algorithms employed here are described in these papers:

- “Curved PN Triangles” by Alex Vlachos, Jörg Peters, Chas Boyd and Jason L. Mitchell.
- “Phong Tessellation” by Tamy Boubekeur, Marc Alexa.

In addition, these techniques also implement:

- HW back face culling.
- HW view frustum culling.
- Adaptive subdivision strategies based on triangle size and orientation.

## Hull Shader

The hull shader stage performs the usual pass through steps that you’d expect, such as, culling, computing tessellation factors and input patch control points.

For the “Curved PN Triangles” this shader stage generates the 7 cubic positional control points, and the 3 quadratic normal control points using the algorithm described in the whitepaper as above.

## Fixed Function Tessellator

The fixed function HW tessellator stage produces new geometry based on the input tessellation factors, as barycentric coordinates in the patch domain.

## Domain Shader

The domain shader stage uses the positional and normal control points to weight the barycentric coordinates of the generated geometry, using one the algorithms described in the whitepapers mentioned above.

## GUI

The GUI allows the user to select between 3 different models, and supply their own model and texture (“user.sdkmesh”, “diffuse.dds”).

## Limitations

This technique works extremely well on models that were authored at a low density, but with normals that define the high density curvature. Models with normals that do not follow the intended curvature will not generate the correct control points, and therefore the resulting tessellated mesh will not be correct.

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