



# Geometric Design

## Level-of-Detail Rendering

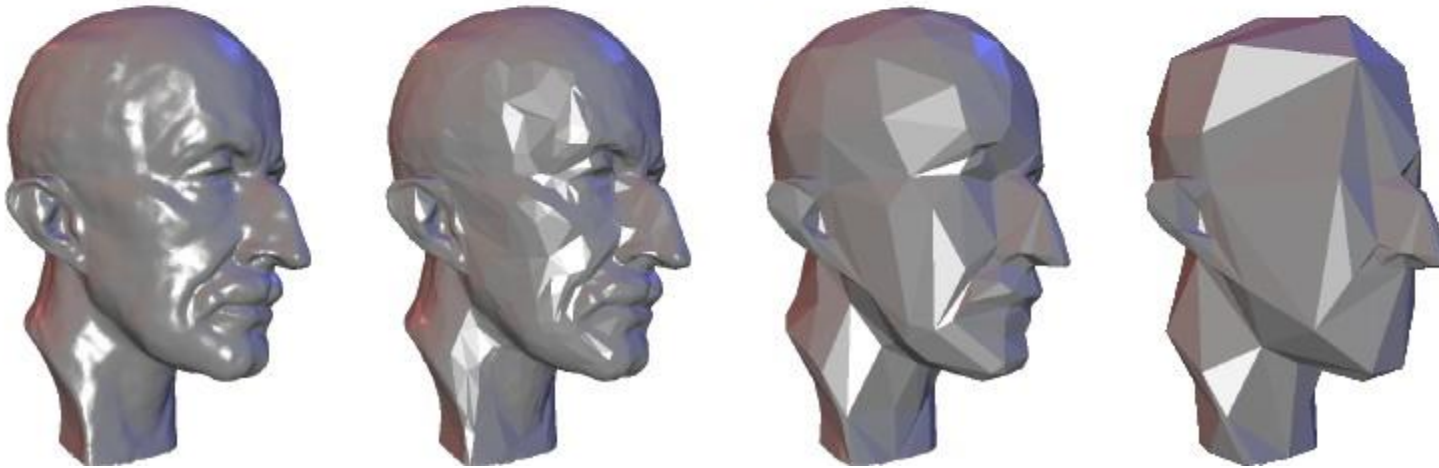
CS 415: Game Development

Professor Eric Shaffer

# Level-of-Detail Rendering

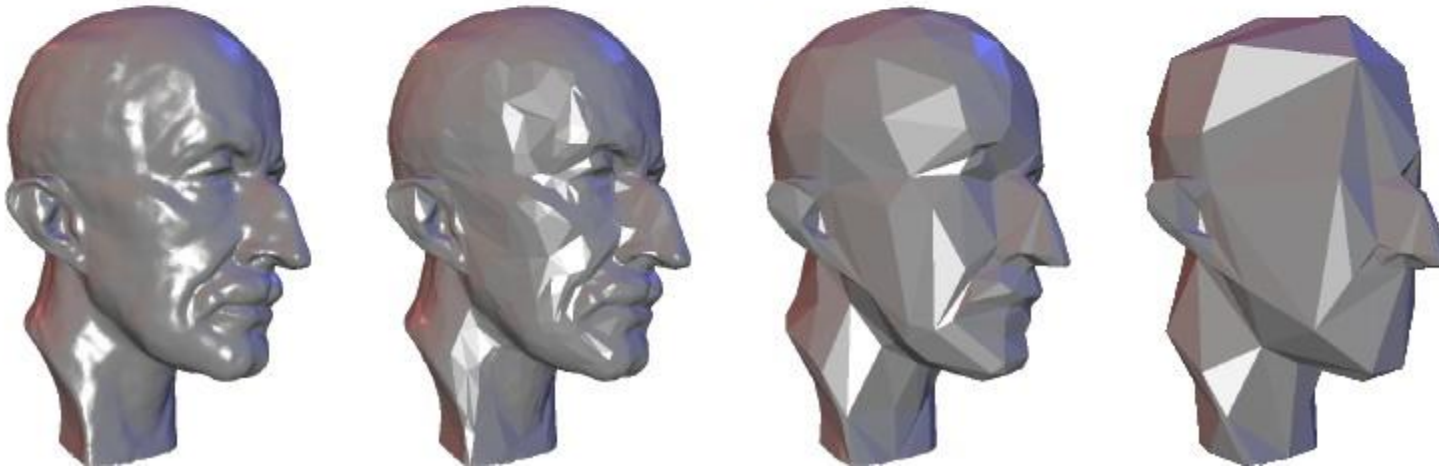
- Construct multiple versions of mesh
  - Varying polygon count
- Multi-resolution hierarchies enable
  - efficient geometry processing
  - level-of-detail (LOD) rendering

Pick which model to use  
based on approximate  
screen size...



# Level-of-Detail Rendering

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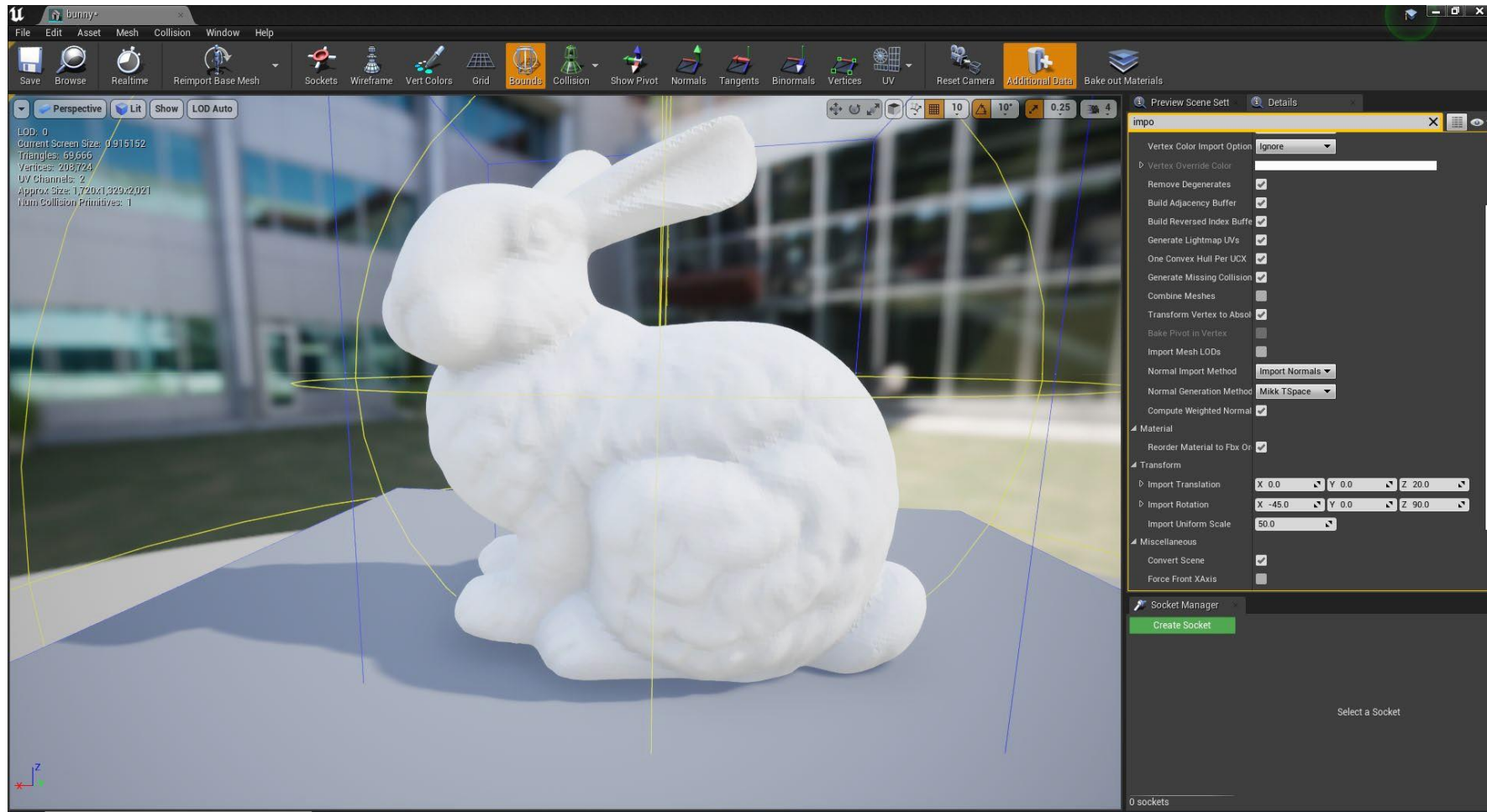
Pick which model to use based on approximate screen size...

Approx screen size → need to guess the width and height in pixels of the rendered mesh....

How could the engine make this guess?



# Unreal Engine 4 Mesh Editor



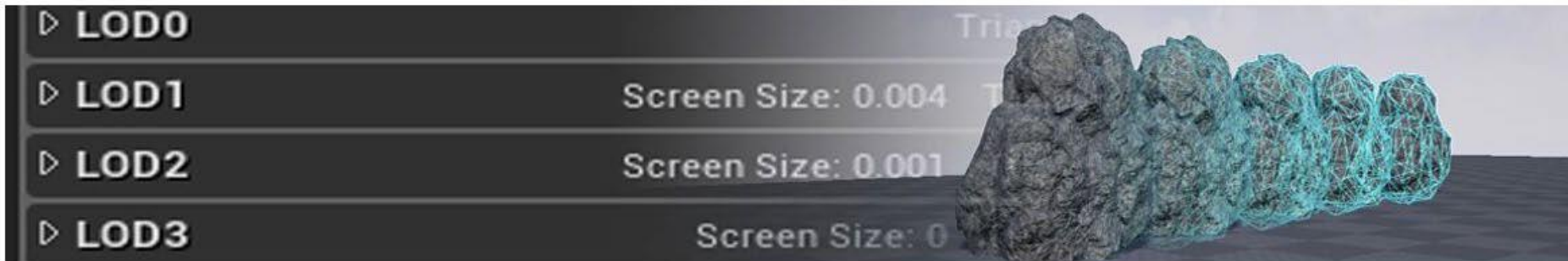


# Generating LODs for a Static Mesh

## Setting Up Automatic LOD Generation

How To use the Automatic LOD Generation system in UE4.

Intermediate



The Automatic LOD generation system allows you to automatically reduce the polygon count of your Static Meshes to create LODs with the Unreal Engine 4 (UE4) Editor. Automatic LOD generation uses what is called **quadratic mesh simplification** to help generate the LODs for Static Meshes. Quadratic mesh simplification works by calculating the amount of visual difference that collapsing an edge (by merging two vertices) would generate. It then picks the edge with the least amount of visual impact and collapses it. When this happens, the tool will pick the best place to put the newly merged vertex, removing any triangles that have also collapsed along with the edge. It will continue to collapse edges until it reaches the requested target number of triangles. In the following guide, we'll show you how-to setup and use the automatic LOD generation system in your UE4 projects.

### ON THIS PAGE

Setup

Creating LODs

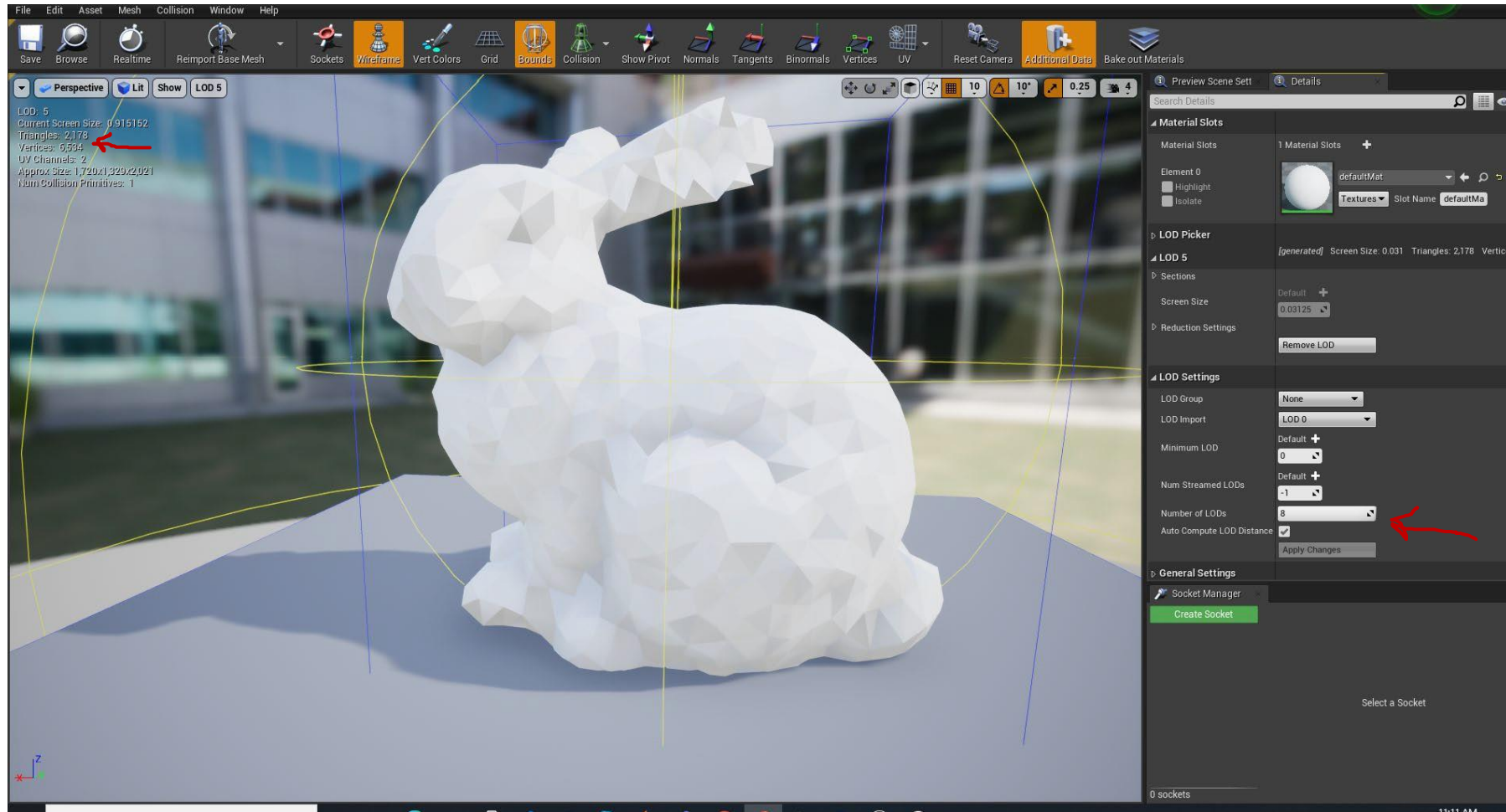
Using LOD Groups

Manually Creating LODs



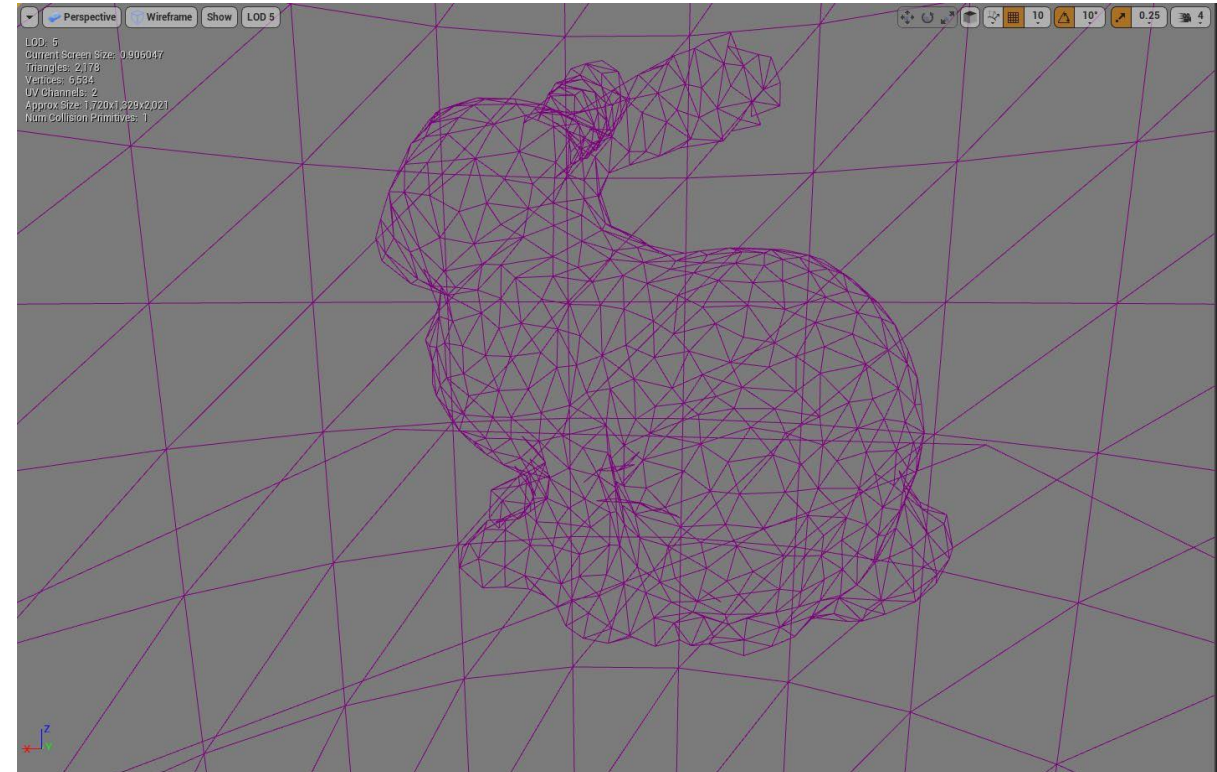
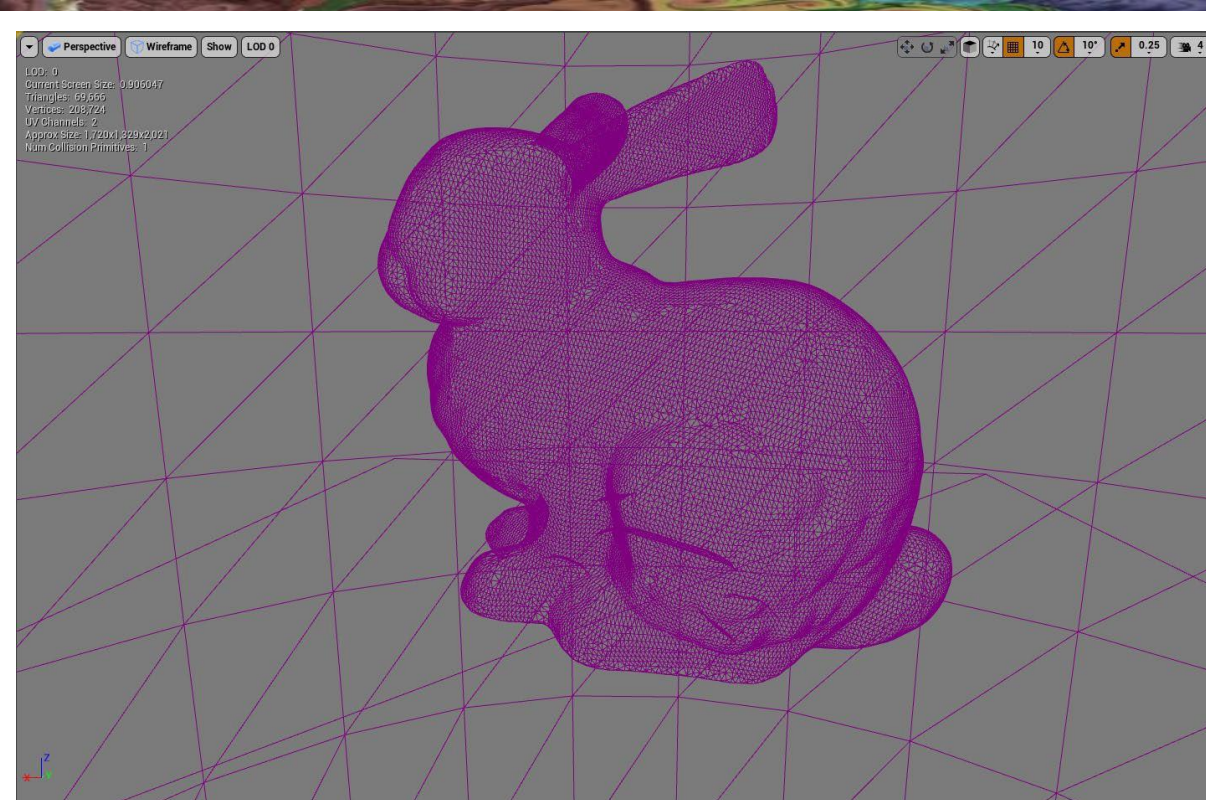
That's wrong - should be **quadric** mesh simplification

# Bunny LOD 5





# Comparison: LOD0 vs LOD5



LOD5 has about 3% of the number of polys as LOD0

# Rendering: LOD0 vs LOD5

