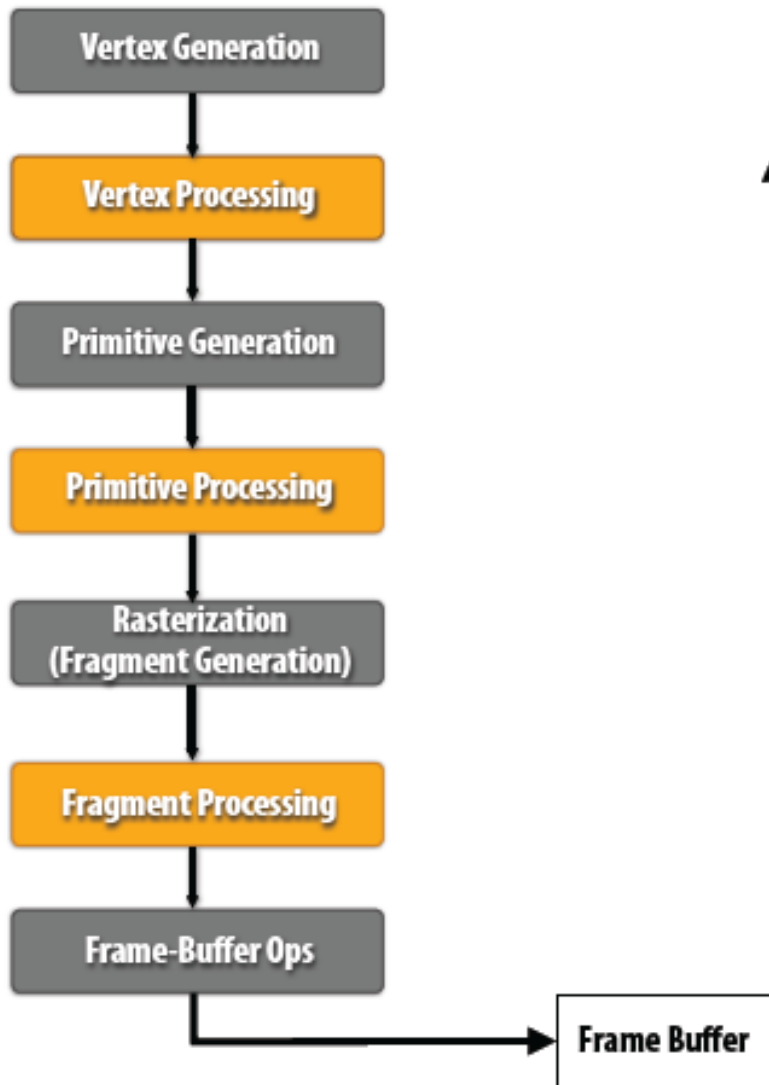


Deferred Shading

The graphics pipeline



“Forward rendering”

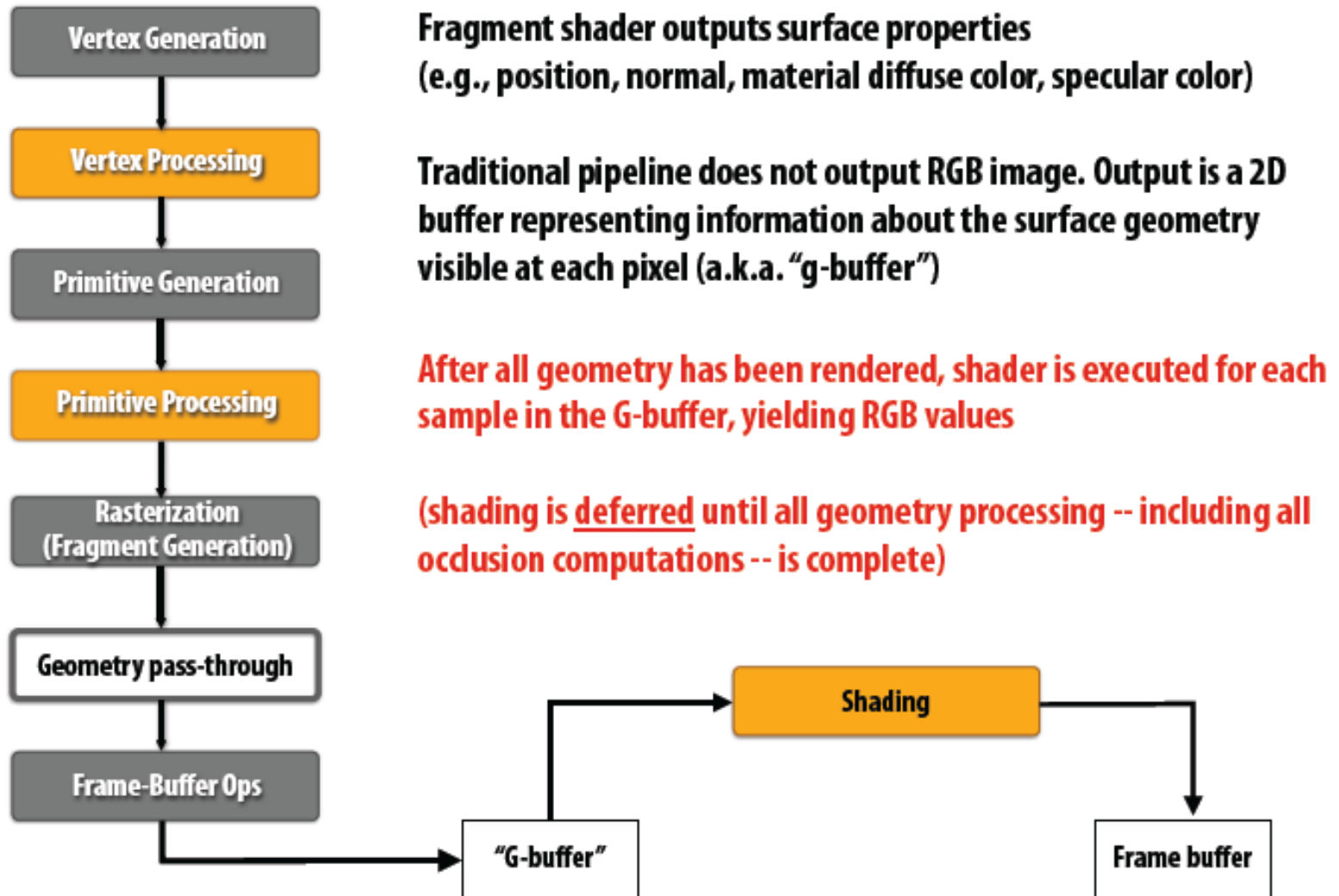
Forward rendering

- Traditional method
- Single pass
 - For each object
 - Find all lights affecting object
 - Render all lighting and material in a single shader
 - Shader for each material vs. light setup combination
 - Wasted shader cycles
 - Invisible surfaces / overdraw
 - Triangles outside light influence

Forward rendering

- Solution to material/light combination issue
- Multi-pass
 - For each light
 - For each object
 - Add lighting from single light to frame buffer
 - Shader for each material and light type
 - Wasted shader cycles
 - Invisible surfaces / overdraw
 - Triangles outside light influence
 - Lots of repeated work
 - Full vertex shaders, texture filtering

Deferred Shading Pipeline



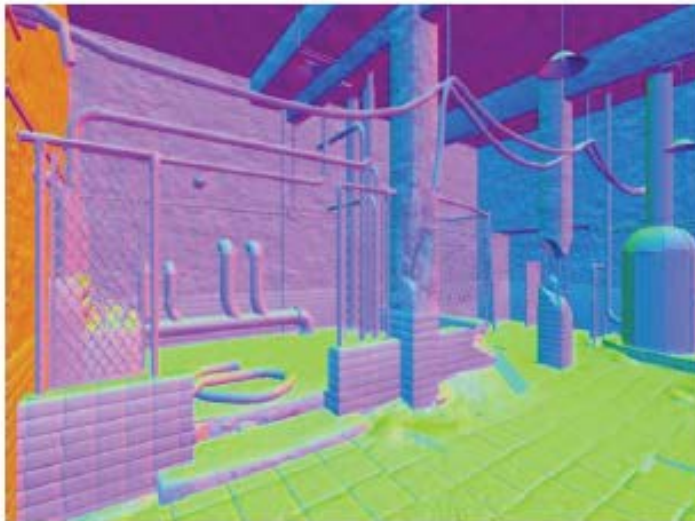
G-buffer = geometry buffer



Albedo (Reflectance)



Depth



Normal



Specular

Deferred Rendering: procedure

1. For each object
 - Render surface properties into the G-Buffer
2. For each light and lit pixel
 - Use G-Buffer to compute lighting
 - Add result to frame buffer
3. Render Transparent Stuff (using forward rendering)