The OpenGL Shading Language on NVIDIA Hardware

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Which Shading Language?

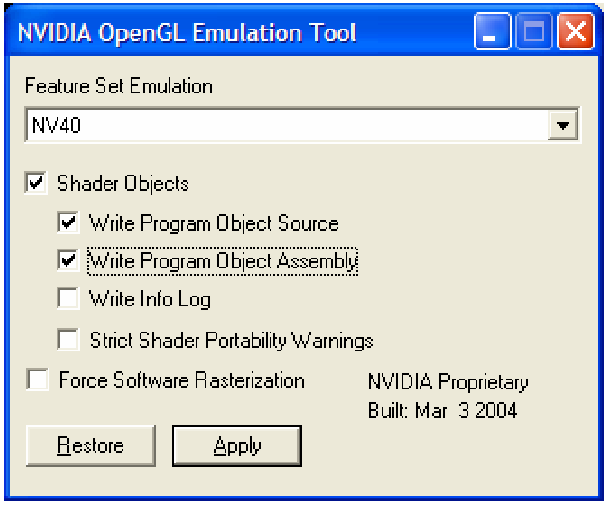
- GLSL
  - Recommended for cross-vendor development
  - OpenGL only
- Cg
  - Compatible with Microsoft’s HLSL
  - Can generate code for ARB_fragment / vertex program
  - New features: interfaces, subshaders
  - CgFX metafile format
  - Recommended for those who want cutting-edge features
- HLSL
  - Recommended for Direct3D applications

Availability

- Available for preview in 56.68 drivers (included in GDC SDK DVD)
- Linux GLSL support coming soon in Rel.60 drivers
- Supported on all GeForce / Quadro FX
  - Earlier generations support vertex shaders only

NVEmulate

- Simple tool to enable shader objects extension
- Available to registered developers
- Allows shader assembly to be dumped to files for debugging



NVIDIA OpenGL Emulation Tool

Feature Set Emulation

NV40

☑ Shader Objects

☑ Write Program Object Source

☑ Write Program Object Assembly

□ Write Info Log

□ Strict Shader Portability Warnings

□ Force Software Rasterization

NVIDIA Proprietary
Built: Mar 3 2004

NVIDIA GLSL Enhancements

- Supports HLSL-style types – float, half, fixed and equivalent vector, matrix types
  - – half precision (fp16) is sufficient for most shading calculations (colors, unit vectors)
  - – faster on GeForce FX series processors
  - – no penalty on other hardware
  - – makes porting shaders easier

Using Half Types Portably

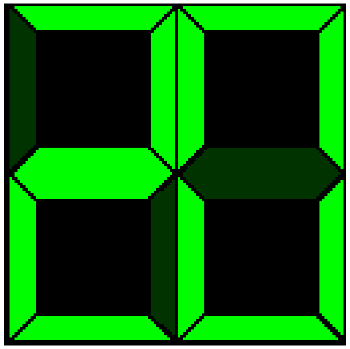
- Can use preprocessor to make code portable:

```
#ifndef __GLSL_CG_DATA_TYPES
# define half2 vec2
# define half3 vec3
# define half4 vec4
#endif
```

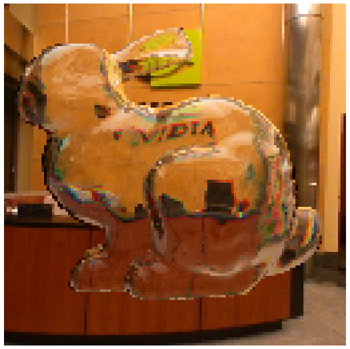
Additional Features

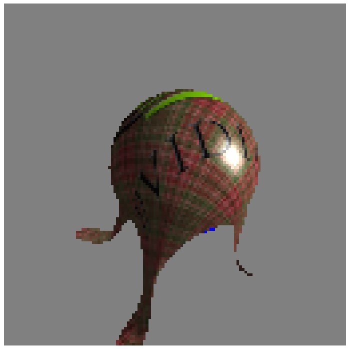
- **#include** works (reserved word in spec but not defined)
- Support Cg standard library in GLSL
  - e.g. refract()
- Can use Cg code with OpenGL **ARB_shader_objects** extension using **EXT_Cg_shader**

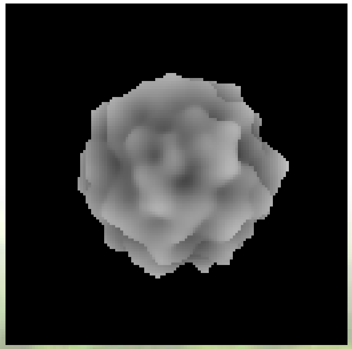
Demos



- glsl_digital_clock
- glsl_dispersion
- glsl_physics
- glsl_skinning
- glsl_vnoise







Questions?

- Send bugs to: **glsl-support@nvidia.com**