NVIDIA Parallel Nsight™
Accelerating GPU Development
in BioWare’s Dragon Age II

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Introductions

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Agenda

- NVIDIA Parallel Nsight and DragonAge II
  - Graphics Inspector
  - Pixel History
  - Graphics Debugger
  - System Analysis
  - Frame Profiler
- PerfHUD Update
NVIDIA Parallel Nsight

Graphics Debugger
GPU Accelerated HLSL shader debugging
Examine shaders executing in parallel
Identify issues with conditional breakpoints

Graphics Inspector
Real-time inspection of DirectX API calls
Investigate GPU pipeline state
See contributing fragments with Pixel History
Profile frames to find GPU bottlenecks

System Analysis
View CPU & GPU events on a single timeline
Examine workload dependencies
Direct3D and OpenGL API Trace

Integrated into Visual Studio 2008 and 2010
Parallel Nsight Environment

Remote Debugging

Desktop

Mobile
Parallel Nsight Environment

Local Debugging: SLI Multi-OS

Full GPU acceleration
Traditional forward renderer
- Depth pass for visibility determination and early pixel rejection
- Directional lightmaps with radiosity for static geometry
- Precomputed light lookup for dynamic objects
- Limited number of dynamic lights on DX9 version (2 per object)
Dragon Age II Graphics Engine Overview

- DX11 code path uses deferred lighting (light prepass)
  - Supports hundreds of small dynamic lights efficiently
- Post-process framework
  - Bloom (compute shader accelerated on DX11)
  - SSAO
  - Depth of field
  - Distortion
Demo: Launching…

Start Nsight Monitor

Configure Parallel Nsight Project Settings

Launch Your Application
Demo: HUD on Running Application

Configurable Performance Graphs
Demo: HUD Showing Depth Complexity
Demo: HUD in Graphics Inspector

- **Bound Textures**
- **Scrub Bar**
- **Direct3D Perf Markers**
Demo: HUD Render Target, Depth & Stencil
Demo: Draw Call Page

- Shader Resources
- Geometry Preview
- Render Targets
- Links to Pipeline Inspectors
Demo: Texture Viewer

Texture Viewer

Texture Inspector

Resource and View Information

Mipmap Thumbnails
Demo: Pixel Shader State Inspector

- Scrubber
- Link to Shader Source
- View Any Stage in the Direct3D Pipeline
- Direct3D State
Demo: Buffer Inspector

Cast to value
Demo: Pixel History

1. Choose Pixel of Interest

2. See All Fragments

3. Goto Draw Call Info or Debug Actual Fragment
Demo: Shader Debugger Breakpoint

Stopped At Breakpoint In Specified Fragment

Visual Studio’s Watch Window Populated

Stepping, Run To Cursor

Full Speed, GPU Evaluated Conditionals, Including Local Variables
Demo: Focus Picker

- **Pixels in Flight**: Select Focus Pixel
- **Change Focus, Locals Update**

The image shows a software interface with code and visual elements related to focus picking in graphics development.
Select CPU, Direct3D, and OpenGL tracing options
Demo: Analysis

- View every thread
- See CPU workloads
- Concurrent draw calls on the GPU
Demo: Frame Profiler

State Buckets: Draw Calls Sharing Common State

Draw Call Statistics & Link To Draw Call Page

Multiple Graphs

Bottleneck Information Per Draw Call
NVIDIA Parallel Nsight: Roadmap

- Released January 2011
- All Professional Features now FREE!
- Licensing restrictions removed
- Microsoft Visual Studio 2010
- Support for the r265 driver
- Support for GeForce GT 420/30/40, GS 450, GTX 570 and GTX 580 GPUs
NVIDIA Parallel Nsight: Roadmap

- Available Q2 2011
- View all graphics resources at a glance
- Numerous usability and workflow improvements
- Graphics profiler performance and accuracy
- Driver independence
- Stability improvements
- Support for r270 driver and latest hardware
DirectX 9 Development?  PerfHUD!

- Version 6.70 Shipped 1/2011
- Support for Fermi GPUs
- Small bug fixes
- Continue to update for new GPUs
- New PerfKit supporting Fermi Q2
Wrap Up…Thank You!

Thanks Andreas and the team at BioWare!

Call to action!

- Download Parallel Nsight and try it out
- Use Direct3D Performance Markers in your game
- Send us feedback on what features you find important

Contact us on the NVIDIA Developer Forums

NVIDIA @ GDC 2011

CAN’T GET ENOUGH? MORE WAYS TO LEARN:

NVIDIA GAME TECHNOLOGY THEATER
Fri, March 4th @ NVIDIA Booth
Open to all attendees. Featuring talks and demos from leading developers at game studios and more, covering a wide range of topics on the latest in GPU game technology.

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