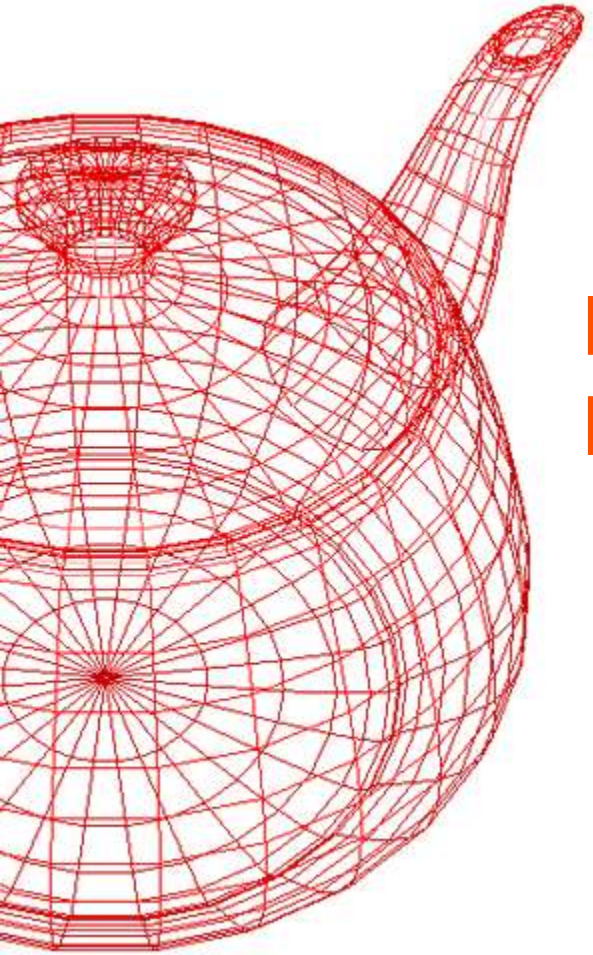

Mixed OpenGL and OpenCL Debugging and Profiling

Yaki Tebeka, CTO
Graphic Remedy

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Parallel Computing over GPUs

- GPUs are massively multithreaded
  - Hundreds of cores
  - Thousands of concurrent threads
- Ideal for parallel computing tasks
  - Significantly faster than multi-core systems
  - Achieving an order of magnitude performance boost

OpenCL

- **OpenCL**™ is a framework for writing programs that execute across heterogeneous platforms consisting of CPUs, GPUs and other processors
- Enables both task-based and data-based parallelism
- An open, royalty-free, cross-platform standard, managed by the Khronos Group
- ICDs from: NVIDIA, AMD, IBM, Apple, …

OpenGL OpenCL interoperability

- OpenGL and OpenCL can share data efficiently
- An OpenCL context can be associated with an OpenGL context / OpenGL share group
- The following associations are allowed
  - OpenCL Image - OpenGL Texture / Renderbuffer
  - OpenCL Buffer - OpenGL VBO

Development Challenges

- Debugging and profiling 3D and parallel computing applications are hard and time consuming tasks
- Delivering, on time, a robust and bug-free 3D and parallel computing applications is a hard
- It is almost impossible to optimize 3D and parallel computing applications to fully utilize the available system resources

gDEBugger

- gDEBugger is an OpenGL, OpenGL ES and OpenCL Debugger, Profiler and Memory Analyzer.
- It provides the information a developer needs to find bugs and optimize application performance

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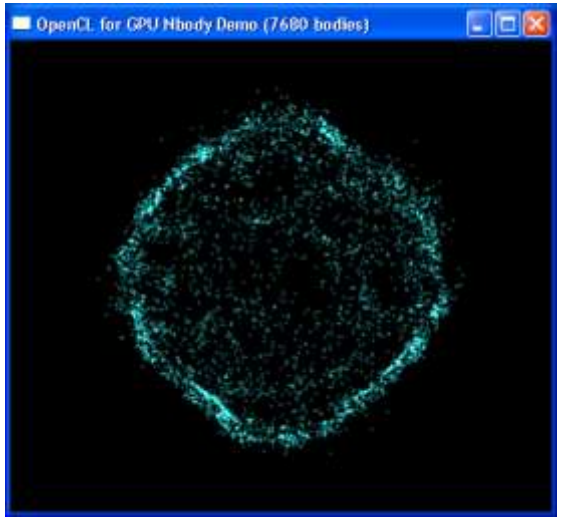
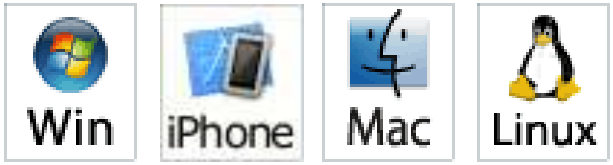
Mixed OpenGL and OpenCL Debugging and Profiling Demo



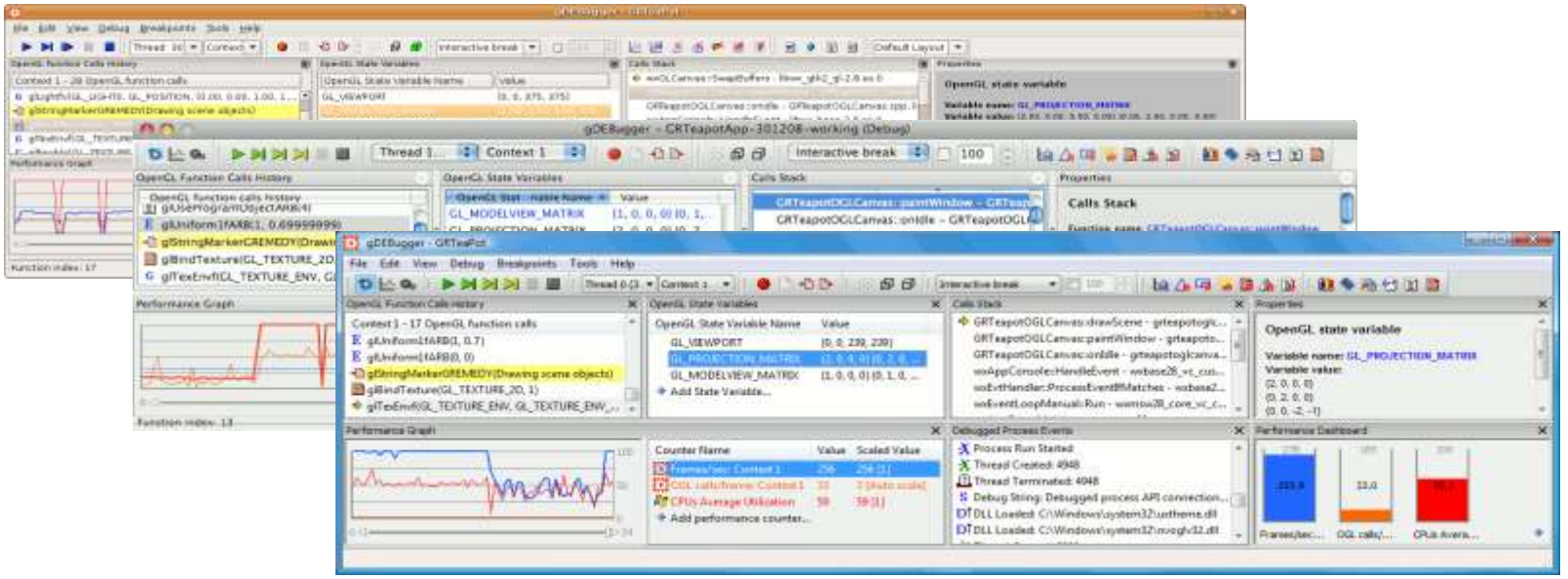
Customer benefits

- Improves application quality
- Optimizes application performance
- Reduces debugging and profiling time
- Shortens "time to market"
- Helps deploying on multiple platforms

Available on



- Windows *OpenGL, OpenGL ES and* ***OpenCL***
- Mac OS X *OpenGL and* ***OpenCL***
- iOS *iPhone & iPad on-device and Simulator, OpenGL ES 1.1 and 2.0*
- Linux *OpenGL and* ***OpenCL***



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Questions?

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