AMD Accelerated Parallel Processing TECHNOLOGY

AMD APP SDK v2.8

Samples Release Notes

1 What's New

New OpenCL samples.

- HelloWorld - Shows how to initialize an OpenCL device and run a very simple OpenCL kernel.
- Memory Model – Shows how to transfer data between host and device, the characteristics of different memory regions (global, constant, local, private), basic synchronization.
- Basic Debugging – Demonstrates basic OpenCL debugging techniques.
- OpenCL C++ Wrapper Introductory - Introduction to the OpenCL C++ wrapper for programmers who have already acquired the basics of OpenCL C API and want to learn how to program with the C++ wrapper.
- OpenCL Static C++ Kernel Language Introductory Sample - Introduction to the OpenCL static C++ kernel language. Uses the C++ wrapper API on the host side, and demonstrates how class objects are transferred between the host and the device in a buffer.
- DX11 – OCL interop – Shows how to use the DX11 sharing extension (`cl_khr_d3d11_sharing`).
- Advanced Multi GPU – Shows advanced use of multiple compute devices, demonstrating an implementation of dynamic workload balancing between devices that have different computational power.
- SoAversusAoS – Shows the performance benefit of using a structure of arrays instead of an array of structures.

Updated OpenCL samples.

- AESEncryptDecrypt – Optimized for performance.
- BinarySearch – Kernel cleaned up and optimized for performance.
- BitonicSort – Increased work-group size; cleaned up kernel; performance improvement.
- BoxFilterGL - Fixing sample to conform with OpenCL™ specification. According to the specification (section 9.7.1), "Applications should destroy the CL command queue and CL context before destroying the corresponding GL share group or contexts."
- DCT – Code clean up; fixed a bug in 8x8 multiplying factors.
- DwtHaar1D - Fixed synchronization problem in DwtHaar1D; use coalesced read/write when copying data from global to local.
- Histogram- Kernel optimized.
- MonteCarloAsian – Performance improvement.
- QuasiRandomSequence – Sample optimized.

- SimpleDX10 – Fixed for Windows 8.
- LDSBandwidth – Added LDS linear write bandwidth.
- BufferBandwidth – Measures non-blocking read/write data transfers rather than blocking ones.

New Bolt samples.

- BoltIntro – A novice level sample that shows how to sort an array of vectors using BOLT and contrasts the performance with `std::sort`.
- New intermediate-level samples, Black-Scholes and RgbtoYuv, show Black-Scholes and color conversion calculations performed using the BOLT transform primitive that contrasts performance to that of `std::transform`.

New Aparapi samples.

- Convolution – Image is filtered for blur and emboss and displayed out.
- Black-Scholes – Shows an implementation of the Black-Scholes model for European options pricing.
- Mandel – Shows a Mandelbrot image of a specific scale, pauses for several seconds, then zooms in for 128 frames; finally, it zooms out to the image it started with.
- Life – Implements Conway's "Game of Life" algorithm, which results in interesting image patterns.

New C++ AMP samples.

- Two new novice-level samples, HelloC++AMP and ParReduction, which introduce C++ AMP features.
- Four new intermediate-level samples: ArrayVsArrayView, SyncVsAsyncArrayCopy, SimpleMultiGPU, and DX11Interop. These illustrate key constructs for using C++ AMP.
- Eight new benchmark samples that show the capability/flexibility of C++ AMP using the ported SHOC benchmarks: FFT, Stencil2D, SPMV, Sort, MD, GEMM, and two bandwidth benchmarks: ArrayBandwidth and TileStataicStorageBandwidth.

2 Samples

- AMD APP SDK samples are located in the `$(AMDAPPSDKSAMPLESROOT)\samples` folder. See the *Installation Notes* and the *Getting Started Guide* for more information. These documents also provide information about using C++ AMP and Aparapi samples.

3 Important Notes

- For a successful build and correct operation of individually downloaded samples, update to Catalyst 12.10 drivers or newer.
- When building on Linux systems, the GL samples require the development files for OpenGL and for the OpenGL utility library. If these are not already installed on your system, install them on your system in order for the sample to build. If required, create a symlink `libGLU.so` to `libGLU.so.1`.
- Support for Microsoft® Visual Studio® 2008 is deprecated.

4 Resolved Issues and Improvements

- BufferBandwidth: This sample now works with Windows 8.
- ImageBandwidth: This sample now works with Windows 8.
- Mandlebrot: When using the vector version of the kernel, it is no longer necessary to divide `LocalThread` by four to ensure correct operation.
- SimpleDX10: This sample now operates correctly on Windows 8.
- The DeviceFission sample now operates correctly if a GPU device is not in the system.
- SimpleDX10 now works when running on the CPU.
- The Histogram Atomics sample now works in Suse32 bit.
- The BoxFilterGL now conforms with specifications.

5 Known Issues

- For correct operation of the samples when using RHEL 5.5 or RHEL 5.8, it may be necessary to build the samples using that OS.
- Mandlebrot: When using the vector version of the kernel, `LocalThread` is divided by four to ensure correct operation.
- SimpleDX10: This sample does not operate correctly when using the MinGW compiler.
- SimpleDX11: This sample does not operate correctly when using the MinGW compiler.
- When building on Linux systems, some samples require the development files for OpenGL and for the OpenGL utility library. This must be installed on your system for the sample to build. In some cases you may also have to create a symlink `libGLU.so` to `libGLU.so.1`.
- If GL samples fail on Ubuntu, ensure that the `libGL.so.1` file is linked to `/usr/lib32/fglrx/fglrx-libGL.so.1.2` for 64-bit systems, and `/usr/lib/fglrx/fglrx-libGL.so.1.2` for 32-bit systems. The sample fails if it is linked to `/usr/lib/x86_64-linux-gnu/mesa/libGL.so.1` for 64-bit systems, and `/usr/lib/i386-linux-gnu/mesa/libGL.so.1` for 32-bit systems. For more details, see:
  http://phoronix.com/forums/showthread.php?7351-Does-fglrx-s-libGL-so-1-2-have-wrong-soname
  https://bugs.launchpad.net/ubuntu/+source/mesa/+bug/943162
- The SDK samples provided with this release of the AMD APP SDK are not necessarily tuned for optimal performance. AMD is improving the samples continually; check http://developer.amd.com/tools/heterogeneous-computing/amd-accelerated-parallel-processing-app-sdk/samples-demos/ for new and updated samples.
- If you intend to use OpenCL on supported AMD GPUs, ensure that a supported display driver is installed on your system before running the SDK installer. You also can run the individual developer and samples `.msi` files from the location to which they are unzipped by the SDK installer in order to manually install any missing components.When running 32-bit samples executables on 64-bit Ubuntu systems, ensure that the `ia32-libs` package is installed. To do this, log in as root and type:

  ```
  sudo apt-get install ia32-libs
  ```

  If the `ia32-libs` package is not installed, running 32-bit samples executables on 64-bit Ubuntu systems can result in the following error message:

```
'clGetPlatformIDs() failed'
```

For more information about this issue, see: http://www.debian-administration.org/articles/534

- Running samples can result in an error if the `TEMP` environment variable contains multi-byte characters.
- The OpenCL NBody may report differences when run with the `--verify` option and a higher number of iterations due to precision differences between the OpenCL and C functions.
- The FluidSimulation2D and NBody samples are the only ones still using glut; thus, they may crash if the “X” button is used to close the application window. This is a known issue in glut64 for all Windows 64-bit operating systems.
- For MinGW64 issues, please read KnowledgeBase article KB125:

  http://developer.amd.com/resources/documentation-articles/knowledge-base/
- Increased error tolerance due to reduced accuracy when using native versions of SIN and COS functions on the AMD Radeon™ HD 6970 and AMD Radeon™ HD 6950 relative to other AMD GPUs.
- Bolt samples, C++AMP samples, as well as SimpleDX10 and FluidSimulation2D cannot be built using the Intel C Compiler.
- Samples that include `cl.hpp` do not build on MinGW. These samples are in the `cpp_cl` folder.
- All samples in `$(AMDAPPSDKSAMPLESROOT)/samples/opencl/benchmark`, as well as GL-based, DirectX, and MultiGPU samples do not work on CPU-only machines
- The AtomicCounters sample fails when built with `AtomicCountersVS12.sln`. Rebuilding the sample after selecting SDKUtil in Project Dependencies => `AtomicCountersVS12.sln` properties solves this issue.

Contact

Advanced Micro Devices, Inc.
One AMD Place
P.O. Box 3453
Sunnyvale, CA, 94088-3453
Phone: +1.408.749.4000

For AMD Accelerated Parallel Processing:

URL: **developer.amd.com/appsdk**
Developing: **developer.amd.com/**
Forum: **developer.amd.com/openclforum**

The contents of this document are provided in connection with Advanced Micro Devices, Inc. (“AMD”) products. AMD makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. The information contained herein may be of a preliminary or advance nature and is subject to change without notice. No license, whether express, implied, arising by estoppel or otherwise, to any intellectual property rights is granted by this publication. Except as set forth in AMD’s Standard Terms and Conditions of Sale, AMD assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.

AMD’s products are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or in any other application in which the failure of AMD’s product could create a situation where personal injury, death, or severe property or environmental damage may occur. AMD reserves the right to discontinue or make changes to its products at any time without notice.

Copyright and Trademarks