
1 What's New in AMD APP SDK v2.8

Key features supported in SDK 2.8 and the Catalyst 12.8 drivers include:

- Support for Direct3D 11 sharing.
- Performance improvement in the OpenCL GPU run-time.
- Performance improvement in the OpenCL CPU run-time.
- Support added for 64-bit atomics.
- Asynchronous dispatch support added for Radeon HD™ 7000-series devices.
- Support for LLVM 3.0.
- Support added for bus-addressable memory.
- 2D max image size increased to 16k*16k.
- UVD performance improvements.
- Samples are now included for BOLT, Aparapi, and C++ AMP.

Bolt data parallel primitives C++ template library, preview release for OpenCL™

- Preview includes the following templates:
 - Scan
 - Sort
 - Reduce
 - Transform
 - Transform reduce
 - Counting

The CodeXL beta integrated hybrid computing (HC) tool suite is recommended for use with AMD APP SDK and can be [downloaded here](#). Features include:

- Unified profiling and debugging on AMD CPUs/APUs/GPUs.
- New user interface with unified look-and-feel, available as a stand-alone Windows or Linux application, and as an extension for Microsoft® Visual Studio® 2010 on Windows.
- GPU Debugger.
 - GPU debugging includes OpenCL™ kernel and API calls.
 - Single-step debugging and breakpoints on a single GPU (running display).
 - Trace API call history (combined C/C++ and OpenCL).

- Multi-watch view of memory, variable values/types.
- CPU Profiler.
 - Profiling suite to identify, investigate, and tune application performance on AMD CPUs.
 - Precise application hot-spot analysis with time-based, event-based, and instruction-based sampling.
 - Call graph profiling, which is a butterfly view of function calls.
 - OpenCL™ source profiling for CPU.
- GPU Profiler.
 - OpenCL™ and DirectCompute™ profiler for AMD Radeon™ GPUs.
 - API trace, kernel occupancy, and hot spots analysis.
 - Comprehensive visualization: timeline and summary views of host, kernel, and data transfers.
 - Supports GPU performance counters.
- Static Analyzer.
 - Static analysis of OpenCL or IL kernels for AMD Radeon™ GPUs, without having to run the application on actual hardware.
 - Estimate accurate performance of OpenCL kernels.
 - View statistics and disassembly of the generated hardware kernel.

APP Math Libraries (APPML) 1.8 new features include:

- FFT:
 - Real-to-complex.
 - Public interfaces for transpose function.
- BLAS:
 - Completed support for all BLAS L2 and 3 functions by adding:
 - *GBMV
 - C/Z-HBMV
 - S/D-SBMV
 - *TBMV
 - *TBSV
 - Modified error return codes.

2 Important Notes

- If you are using Windows, verify that the `AMDAPPSDKROOT` environment variable is present. If the variable is not present, add it and set its value to one of the following:
 - `C:\Program Files\AMD APP\` (for 32-bit OS)
 - `C:\Program Files (x86)\AMD APP\` (for 64-bit OS)

- The following values are returned when querying strings from OpenCL:
 - `CL_PLATFORM_VERSION`: OpenCL 1.2 AMD-APP (build #).
 - `CL_PLATFORM_NAME`: AMD Accelerated Parallel Processing.
 - `CL_PLATFORM_VENDOR`: Advanced Micro Devices, Inc.
- Check the Platform Vendor string, not the Platform Name, to determine AMD hardware. For example code that shows how to check and use the `CL_PLATFORM_VENDOR` string, see the AMD APP v 2.8 Samples.
- Driver support for 7xx generation GPUs is EOL. AMD drivers no longer support 7xx generation GPUs; this includes support for ATI Radeon™ HD and ATI Mobility Radeon™ HD 4000 series devices, ATI FirePro™ V8750, V8700, V7750, V5700, V2750, ATI Mobility FirePro™ M7740, and AMD FireStream™ 9270, 9250.
- To develop applications using deprecated OpenCL™ API calls, `#define CL_USE_DEPRECATED_OPENCL_1_1_APIS`.
- When parsing `#include` directives, the OpenCL compiler resolves relative paths using the current working directory of the application through the `-I` compiler option.
- It is necessary to install Catalyst 12.10 graphics drivers prior to installation of SDK 2.8. Vital components of AMD's OpenCL solution are now contained within the drivers.
- Under Windows, making OpenCL runtime calls from `dllMain` can result in undefined behavior.
- The binary `clinfo.exe` is now located in the `\Windows\System32` directory.
- On Linux and Windows platforms, every GPU is assigned an ordinal number. To expose only a subset of GPUs to a specific application, make the following environmental variable definition: `GPU_DEVICE_ORDINAL=0,1,2 ...`.
- Support for Microsoft Visual Studio 2008 is deprecated.
- HD4XXX device support is EOL. Catalyst drivers no longer include support for these devices. See the OpenCL SDK driver and compatibility page for more details.
- Aparapi is available from <http://code.google.com/p/aparapi/>
- See the APP SDK 2.8 Samples Release Notes for known issues and important notes for the SDK samples.
- The AMD APP Profiler and APP Kernel Analyzer are now provided as part of CodeXL, which is available as a separate download from <http://developer.amd.com/tools/hc/CodeXL/Pages/default.aspx#download+B34>
- See the CodeXL release notes for known issues and important notes for the SDK samples.

3 Naming Convention

For Windows:

- The `__stdcall` calling convention is used for all Windows platforms.
- Function names are undecorated.
- It is not possible to use this OpenCL DLL on Windows with an application that was linked against a library using the `__cdecl` calling convention.

For Linux:

- The calling convention is `__cdecl`.

4 Resolved Issues

- On 64-bit Win7/Vista systems, use of AVX code generation no longer produces incorrect results.
- Vector class now can be used as a replacement for `std::vector` in production code in all cases.
- When using the C++ Wrapper API, Functor interfaces now correctly pass events.

5 Known Issues

5.1 Compiler

- Use of dynamic pointer assignment in kernels that are executed on the GPU cause inefficient code generation.
- Many OpenCL specification compiler options are accepted by the AMD OpenCL compiler, but are not implemented. The implemented options are `-D`, `-I`, `w`, `Werror`, `-cldouble-precision-constant`, `-cl-opt-disable`, and `-cl-fp32-correctly-rounded-divide-sqrt`.
- The compiler may accept illegal cast-to-union (GNU GCC Extension) cases. In such cases, a warning is issued. This may be fixed in a future release.
- If an argument to an OpenCL kernel function is optimized away late in the compilation process, the compiler may fail to build or produce undefined results. This occurs when either an argument gets entirely optimized away or when part of an argument gets optimized away. Part of an argument can get optimized away if two (for 64-bit data types) or four (for all other types) consecutive components of an argument are not used where the first unused component is a multiple of 2 or 4.
- When using the C++ Wrapper API, some string copy operations do not function correctly. Check the Khronos website for an updated version of `cl.hpp`.

5.2 Runtime

- The OpenCL runtime currently does not validate handles to OpenCL memory objects.
- Under Windows Vista, to prevent long programs from causing a dialog to be displayed indicating that the display driver has stopped responding, disable the Vista Timeout Detection and Recovery (TDR) feature, which is trying to detect hangs in graphics hardware. To do this, use `regedit.exe` to create the following `REG_DWORD` entry in the registry, and set its value to 0:


```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\GraphicsDrivers\TdrLevel
```

 This avoids the constant polling by the driver and the kernel to prevent long work units from monopolizing the device. (To restore default functionality, set the `TdrLevel` to 3.)

Note that Microsoft strongly discourages disabling this feature, and only recommends doing so for debugging purposes. Do so at your own risk.
- On Linux platforms, if a kernel deadlocks the GPU, the system becomes unresponsive for a few minutes, and both the X-window server and the application become defunct processes. The system must be rebooted in order to use the GPU again.

- If the `clGetPlatformIDs()` failed error is issued with a properly installed ICD while running 32-bit code on a 64-bit system, ensure that all necessary 32-bit libraries are installed. The specifics of this vary between Linux distributions; consult your OS documentation for more information. The `libGLU.so` library is known to trigger this problem, but there may be others, depending on the specific installation.
- In Linux for non-Southern_Islands platforms, the OpenCL runtime currently exposes less than the total amount of memory physically available on the card. In Windows and on Linux or Southern-Islands-based platforms, the OpenCL runtime reports the total amount of physical memory for boards with up to 2 GB.

5.3 Interoperability

- For OpenGL interoperability with OpenCL, there currently is a requirement on when the OpenCL context is created and when texture/buffer shared allocations can be made. To use shared resources, the OpenGL application must create an OpenGL context and then an OpenCL context. All resources (GL buffers and textures) created after creation of the OpenCL context can be shared between OpenGL and OpenCL. If resources are allocated before the OpenCL context creation, they cannot be shared between OpenGL and OpenCL.

5.4 MPEG-2 Decode

- There is a known issue in this release when trying to check the capabilities of the Cypress GPU: it incorrectly reports that it can decode MPEG-2 VLD. This GPU, which has UVD 2.2, does not support MPEG-2 decode capability. AMD hopes to address this issue in a subsequent version of the driver.

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