



CodeXL 2.3 GA Release Notes

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Thank you for using CodeXL. We appreciate any feedback you have! Please use the [CodeXL Issues Page](#) to provide your feedback.

You can also check out the Getting Started guide and the latest CodeXL blog at GPUOpen.com

This version contains:

- For 64-bit Windows platforms
 - CodeXL Standalone application
 - CodeXL Microsoft® Visual Studio® 2010 extension
 - CodeXL Microsoft® Visual Studio® 2012 extension
 - CodeXL Microsoft® Visual Studio® 2013 extension
 - CodeXL Microsoft® Visual Studio® 2015 extension
 - CodeXL Remote Agent
- For 64-bit Linux platforms
 - CodeXL Standalone application
 - CodeXL Remote Agent

New in this version

CodeXL v2.3 adds the following major features on top of the CodeXL v2.2 feature set:

- Support Linux systems installed with amdgpu-pro driver
- Support for AMD Radeon RX 480 and RX 460 GPUs
- Support for AMD Ryzen Processor
- CPU Profiling
 - Support Count Mode profiling in CodeXLCpuProfiler CLI. In this mode, the CLI counts the number of occurrences of monitored events.
 - CodeXLCpuProfiler CLI supports headless servers to collect and analyze profile data.
 - CodeXLCpuProfiler CLI generates Call Graph section if the CallStack sampling is enabled during profile data collection.
 - Many GUI fixes and improvements to make it more stable.
- Power Profiling
 - Support RAPL Energy counters for AMD Ryzen Processor.
 - Simplified Summary View for Timeline profiling for AMD Ryzen processor.
 - Module level attribution (Now available in the Command Line tool on Linux also).
 - Many GUI fixes and improvements to make it more stable.
- GPU Profiling
 - ROCm 1.4 support
 - ROCm: Support collecting timing data for data transfers
 - ROCm: Support AQL Packet tracing
 - CodeXLGpuProfiler CLI switches for specifying a start time and duration (in milliseconds) to profile an application.
 - CodeXLGpuProfiler CLI switch for reporting the number of passes required for a given counter set
 - Support Whole Application Replay for collecting perf counters for ROCm and OCL applications
 - Support generating single-pass counter files that can be used with Whole Application Replay
- GPU Debugger Back-End
 - Remove HSA debugging support
 - Disable OpenCL kernel debugging on new OpenCL™ with open source LLVM Lightning compiler path which can't be supported by the existing AMDIL-based patching debugging technology

System Requirements

CodeXL contains a host of development features with varying system requirements:

- **Frame Analysis**
 - Radeon Software Crimson Edition 16.7.3 (driver 16.30.2311) is the recommended driver. See "[Getting the latest Radeon software release](#)" section below.
- **GPU Profiling and OpenCL™ Kernel Debugging**
 - An AMD GPU (Radeon HD 7700 series or newer, desktop or mobile version) or APU is required.

- Radeon Software Crimson Edition 16.8.1 (driver 16.30) is the recommended driver on Windows, and the latest amdgpu-pro (driver 16.30) on Linux.
- Earlier HW configurations (Radeon HD 5000/6000 series) are no longer supported by Radeon Software Crimson Edition and CodeXL 2.0. For these configurations please install CodeXL 1.9 (available [here](#)) and the AMD Catalyst driver release 13.11 or later. Catalyst 15.9.1 (driver 15.201) is the recommended version.
- OpenCL™ kernel debugging requires the closed-source AMD OpenCL compiler.
- **HSA Profiling**
 - Supported on the ROCm stack, version 1.4. See the below link for supported hardware configurations:
 - <https://rocm.github.io/hardware.html>
 - Follow the installation instructions at the following link to install ROCm:
 - <https://rocm.github.io/install.html>
 - Should a new version of the ROCm become available, the version of the profiler included in CodeXL may need to be updated in order to be compatible with that version. If/when a new runtime is published to GitHub, we will also publish new HSA Profiler binaries on GitHub (<https://github.com/RadeonOpenCompute/ROCM-Profiler>). There will be instructions included in the aforementioned repository describing what steps may need to be taken to use a new profiler build with an existing CodeXL build.
- For **GPU API-Level Debugging**, a working OpenCL/OpenGL configuration is required (AMD or other).
- **CPU Profiling**
 - Time-Based Profiling can be performed on any x86 or AMD64 (x86-64) CPU/APU.
 - The Event-Based Profiling (EBP) and Instruction-Based Sampling (IBS) session types require an AMD CPU or APU processor.
 - CPU Profiling on Linux platforms - Limitations of PERF
 - CPU profiling uses PERF which requires kernel 2.6.32 or later. CPU Profiling with Call Stack Sampling requires Linux kernel 3.0 or later. However, we recommend using kernel 3.2 and above which has shown to be more stable.
 - Call chain analysis on Linux currently depends on the call chain information provided by Linux PERF. This requires the profiled binaries to have stack frame pointer. (i.e., compiled with `-fno-omit-frame-pointer`).
 - For non-root users to run CodeXL CPU profiling, `"/proc/sys/kernel/perf_event_paranoid"` needs to be set to `"-1"`.
 - Instruction-Based Profiling on Linux requires Linux kernel 3.5 and above.
 - Call chain information (stack trace) for inline functions is not available.
- **CPU Profiling on VMWare**
 - Time-Based Profiling (TBP) and Event-Based Profiling (EBP) are supported in guest OS running on VMware Workstation 11.0 or later.
 - If VMWare Workstation's Virtual Performance Monitoring Counters (VPMC) is not supported on a given CPU, then only time-based profiling will be available. Event-Based Profiling will not capture any data other than CPU cycles.

- Event-Based Profiling works on Windows and Linux guest OS in these scenarios:
 - Host OS: Windows, Guest OS: Window 7, Windows 8.1, Win10, Ubuntu 14.04, RHEL 7
 - Host OS: Linux, Guest OS: Window 7, Windows 8.1, Win10, Ubuntu 14.04, RHEL 7
- Basic CPU configuration requirements:
 - CPU should support SVM or AMD-V feature. Without this VMware will not be able to do hardware virtualization.
 - This CPU feature can be enabled/disabled from BIOS settings.
- **Power Profiling**
 - Supported on:
 - AMD Ryzen CPU Processor.
 - Carrizo, Kaveri, Mullins and Temash APUs.
 - The majority of the Graphics IP 7 GPUs (code name "Sea Islands") or more recent, including AMD Radeon™ and AMD FirePro™ models.
 - AMD Radeon RX 500 Series.
- **Static Analysis**
 - OpenCL/DirectX 11 kernel/shader analysis requires a working AMD OpenCL/DirectX 11 configuration
 - OpenGL shader analysis on Windows requires Catalyst 15.9. (driver 15.20) or later

Supported platforms:

- Windows platforms
 - Windows 7 64-bit, 8.1 64-bit and 10 64-bit (including Windows 10 Anniversary Update).
 - Windows 7 & 8.1 require to install Microsoft update KB2999226
<https://support.microsoft.com/en-us/kb/2999226>
 - Note: For the CodeXL Visual Studio 2010/2012/2013/2015 Package, the station must be installed with Visual Studio 2010/2012/2013/2015, respectively. However, the CodeXL Standalone Application does not require Visual Studio to be installed.
- Linux platforms
 - Red Hat EL 7 64-bit
 - Ubuntu 16.04 64-bit
 - SUSE 11 SP3 64-bit

Getting the latest Radeon software release

The way to get the latest beta driver is to use the links "Latest Windows Beta Driver" and "Latest Linux Beta Driver" on the Graphics Drivers support page:

<http://support.amd.com/us/gpudownload/Pages/index.aspx>

Note about installing CodeAnalyst after installing CodeXL for Windows

AMD CodeAnalyst has reached End-of-Life status and has been replaced by CodeXL. CodeXL installer will refuse to install on a Windows station where AMD CodeAnalyst is already installed. Nevertheless, if you

would like to install CodeAnalyst, do not install it on a Windows station already installed with CodeXL. Uninstall CodeXL first, and then install CodeAnalyst.

Fixed Issues

The following are the major fixes that were not part of the v2.2 release and are new to this version:

- Initializing AMDTPowerProfileAPI returns AMDT_ERROR_FAIL. (1502)
- Support DX12 in the Analyzer. (426092, 1512)
- “Windows requires a digitally signed driver” pop up comes up on launching CodeXL on Win 7 OS. (3391)
- CodeXLCpuProfiler CLI throws “Output directory does not have write permission” on using relative path. (3409)
- Function information is sometimes missing from the csv file generated by the CPU Profiler command line tool’s ‘report’ command. (3480)
- Changing functions in the CPU Profiler’s source view for a session of a profiled Java application causes a crash. (3484)
- Stopping a CPU Profiling session where the CodeXLPowerProfiler is the profiled application and the session was initiated from CodeXL GUI causes kernel panic on Linux (Ubuntu). (3500)
- For CPU Profiling system-wide profile, right clicking a module and selecting "Display in function view" opens the Functions tab displaying all of the session functions. (3516)
- For a session containing multiple profiled processes, the CPU Profiler’s source code view’s TID drop-list contains only the ‘all threads’ value. (3519)
- In CPU Profile Overview page clicking on PLT function leads to crash instead of taking to Source View page. (3524)
- BSOD observed once on Win 10 OS while running system wide CPU Profiling. (3528)
- CodeXLCpuProfiler fails with “Invalid Core Affinity Mask” (3564)
- Empty Function Tab shown on double clicking any module in Module View. (3565)
- Unable to install Power Profile driver on RHEL 7.3 (3573)
- ROCm Profiler backwards compatibility with ROCm 1.2 and earlier (3581)
- Update Perf counter UI in CodeXL to deal with possibility of multiple columns for the same counter (3666)
- Update HSA Data Transfer UI in the timeline to support concurrent data transfers (3671)
- CodeXL GUI crashes the moment Power Profiling’s “Select Power Counters” button is clicked. (3673)
- CodeXLCpuProfiler fails to work with Custom Profile XML file. (3737)
- On Linux, Power Profiler generates lesser than expected number of records. (3740)
- CodeXLCpuProfiler crashes during data translation. (3741)
- CodeXLPowerProfiler CLI consumes 100% CPU utilization. (3742)
- On Linux, CodeXLPowerProfiler CLI does not support “-M module” option. (3749)
- CodeXL GUI crashes on opening Source View CLU session. (3768)
- On Linux, CodeXLPowerProfiler crashes while collecting process data with “-M process” switch. (3779)
- CodeXLPowerProfiler does not honor lower sampling interval like 10ms. (3816)
- The sample program using Power Profiler API is crashing. (3817)
- CodeXL GUI crashes if hotspot indicator is changed in Overview tab for CLU profile type. (3825)

- Crash on providing header file as input when CodeXL prompts the user to locate source file. (3826)
- Allow navigation to Functions Tab from the other row of Function Overview table. (3838)
- CPU Profiling crashes while running Time Based Profiling on Java applications. (3839)
- CodeXL GUI crashes while displaying CPU Profile Source View for Java applications. (3843)
- Disable right click option in Power Profiler GUI timeline view. (3859)
- In Power Profiler's Summary View, for Frequency histograms provide zooming functionality. (3863)
- Power profiler's Process or Module level profiling for long profile duration, leads to missing records. (3869)
- In CPU Profiler's Source View, samples are not reported when data columns are [de]selected through display filter settings. (3883)
- Linux kernel panic observed if CodeXLPowerProfiler CLI process is killed while profiling is in progress. (3891)

Known Issues

- Debugging OpenCL kernels that use read-modify-write atomic operations is not supported.
- GPU Debugging on OpenCL Static C++ Kernels is not supported. (334415)
- OpenCL 1.2 keyword printf and barriers are not supported during kernel debugging.
- Building kernels with OpenCL 1.2 clCreateProgramWithBinaries and clLinkProgram API prevents the display of source code when debugging these kernels. (369171)
- Performing CPU Profiling with Call-Stack Sampling (CSS) enabled, on systems with discrete graphics card (Radeon HD 5000, 6000 or 7000 series) and Linux kernel version 3.0 or lower, may result in Linux kernel panic. This kernel panic does not occur with Linux kernel version 3.2 onwards. (352399)
- CPU Profiling is disabled on Windows 8 and 8.1 if Hyper-V is enabled. (438549)
 - Note that installing Microsoft Windows Phone 8.0 SDK activates Hyper-V.
- PERF call chains which contain call stacks across modules have shown to be truncated. This results in inaccurate "Deep Samples", "Downstream Samples", and "Call Path" analysis.
- If gDEDebugger 6.x is installed on the machine, mouse click doesn't start text fields editing in CodeXL Visual Studio Extension. [Workaround: Navigate to the text fields using TAB or uninstall gDEDebugger before installing CodeXL.](#) (344811)
- Menu items are present but not visible after minimization and restore of CodeXL in Ubuntu system using Unity theme. [Workaround: Use Unity 2D theme instead of Unity theme.](#) (353082)
- AMDTTeapot sample may crash while debugging OpenCL kernels after multiple step operations (45 or more). (357741)
- CPU Profiling on Windows 8 shows two target applications in Profile Overview. The conhost.exe process is an actual executable. This process fixes a fundamental problem in the way previous versions of Windows handled console windows, which broke drag & drop in Vista.
- If CodeXL is installed in path that includes non-ASCII Unicode characters, profiling does not work (365118).
- GPU Debugger does not display locals when debugging a kernel with extremely large buffers or worksize. (23, 1156)
- Power Profiling of Tonga and Iceland dGPUs is disabled. (36, 1497)

- The Call-graph view for CPU Profiling with call stack collection of 32-bit applications may show two separate paths for a function that has a single path. (223)
- If the profiled station goes into Sleep/Hibernate state during a Power Profiling session, only data collected before hibernation is displayed, and the navigation slider does not respond. (459572, 224)
- GPU Debugger does not stop at breakpoints inside kernels that take a very long time to execute and cause a driver TDR. (240)
- Performing 2 GPU Profiling sessions concurrently - Timeline Application Trace and Performance Counters - on a Red Hat Linux System may cause a system hang after several minutes. (259, 68176)
- CPU Profiler runs out of memory and closes down while performing post-processing of a system-wide profile session that combines IBS, CLU and Time-based sampling for over 5 minutes. (265)
- CPU Profiling multiple processes with call stack collection may result in call graph view displaying addresses instead of function names for functions used by more than one process. (289)
- The GPU Debugger can't step into a kernel if blocks that contain a return statement. (349)
- Windows system crash (Blue Screen of Death) is observed, if CPU Profiling using Event-Based-Profiling is run both in guest and host OS or if CPU Profiling using Event-Based-Profiling is run on host OS while the guest OS is launched. This is an issue in the VMWare VMM driver. (907)
- GPU Profiler does not display any hsa_*_get_info calls in host thread calls list if they are callbacks encompassed by hsa_iterate_agents calls. (980)
- CPU Profiler time-based profiling on a VM may produce more samples than the session duration and sampling interval suggest. (1125)
- Power Profiler displays zero values for 'Others' counters in Summary view if only dGPU counters are selected. (1200)
- GPU Debugger skips the internal loop in APP SDK nBody sample. (1250)
- In CPU Profiler's Time-Based Profiling, an unexpected low number of samples is collected when running on guest Win10-64 OS. (1277)
- Step-in operations require over a minute when debugging clFFT sample. (1324)
- Unable to launch GPU profiler - cannot allocate memory error on starting profiling after running 2 or 3 GPU Profiler timeline trace sessions for 2-3 min. (1347)
- CodeXL throws segmentation fault while launching on Linux through SSH. (1533)
- The HSAIL Debugger's Debugged Process Events viewer shows SIGPIPE or SIGBUS error while debugging HSAIL Applications. (1590)
- Multiwatch view is disabled while debugging HSAIL. (1628)
- API/Draw/Frame steps should be disabled while doing HSAIL debugging. (1648)
- Newly registered Windows Store Apps do not appear in the Project Settings list of apps. (1688)
- CPU Profiler doesn't launch Windows Store App that is specified in project settings. (1689)
- System Information dialog's OpenCL Devices tab appears empty on Linux. (1954)
- GPU debugger backend crashes when we close the Teapot window on I+A system. (2201)
- On some Windows 7 stations the GPU profiler command-line tool fails with error message "AMDRTBaseTools-x64.dll is missing". (2361)
- In Visual Studio Host+GPU debug session, execution of the debugged application resumes and doesn't break when performing a 'step out' operation. (2412)
- For some debugged applications, the HSA Debugger breakpoints are not hit. (2516)
- Frame Analysis runs out of memory when loading and displaying ~40 captured frame traces at once. (2561)

- In Visual Studio, after using Frame Analysis to capture frame traces, clicking a frame thumbnail without stopping the session may lead to "Session Aborted" error pop up followed by "Failed to load frame data" error. (2893)
- Cannot open a GPU Profiler session once we rename it, after re-starting Visual Studio. (2912)
- CPU Profiler does not display symbol information on importing a .prd file. (2942)
- FLAT_* ops get classified incorrectly as 'Vector ALU' in Analyze Mode. (3080, [GitHub issue #25](#))
- The GPU debugger does not display OpenGL static buffers when running inside the Visual Studio extension and 'Break' is clicked. (3167)
- Modules are identified as 'Unknown' in Power Profiler sessions when the profiled process is run after the profiler's command line tool session began. (3168)
- Some Steam games may crash when Steam is launched from CodeXL Frame Analysis mode. (3172)
- Visual Studio displays error "The following session files could not be deleted" when deleting a CodeXL Power Profiling session. (3179)
- Filtering the CPU Profiling display based on CPU Core/Numa is disabled in the display filter. (3233)
- When CPU Profiling on Linux, C++/Java inline functions are shown with generic names or missing. (3240)
- The Vulkan versions of Doom and The Talos Principle fail to start when launched from Steam as part of a Frame Analysis session on Windows. (3364)
- When launching the Vulkan version of DOTA2 from Steam as part of a Frame Analysis session on Linux, The game must be manually shutdown at the end of the session else viewing frame traces and session export will fail. (3381)
- The CPU Profiler's Overview '5 Hottest functions' table does not filter out JVM functions when profiling Java applications on Linux. (3497)
- Double clicking a function name in the CPU Profiling session's Functions view displays an empty source view for profiled Java applications on Linux. (3498)
- Double clicking a module name in the CPU Profiling session's Overview displays an empty source view for profiled Java applications on Linux. (3499)
- On Linux, GPU Profiling Performance Counters of an OpenGL application may cause a system hang after a few seconds. (68152)
- In Power Profile sessions on machines without Catalyst installed, 'iGPU Frequency' is constantly shown as 100MHz. If Catalyst is installed, then CodeXL reports the proper integrated-GPU frequency. (459364)
- Collecting GPU Profiler performance counters on the integrated GPU on an APU while another 3D app is running outside CodeXL can lead to a display hang. (68176)
- Debugging OpenGL kernels with optimizations disabled may cause kernel hang / driver not responding (TDR) in Radeon Software Crimson Edition (driver 15.30). (80095)
- For Power Profiler's Process/Module profiling, "Process Name" and "Process path" is shown as "unknown" for some of the user space applications. (3792)
- Timeline view's energy/power graphs highlight multiple (first counter is always shown selected) counters though only one counter is selected. (3873)
- Some power profile counters are all plotted in Black for imported session. (3877)
- On Linux, first run after killing power profile run gives zero records. (3902)
- For process/module profiling, Irrespective of admin/non-admin privilege, launch app with CodeXLPowerProfiler CLI is always shown as unknown. (3904)

- For Remote Power Profiling, counters are shown without Counter Type (heading: Power, Frequency, Temperature). (3914)
- Caching of files/.pdb/executable not working with CPU Profiling session. (3244)
- On Linux, "5 Hottest functions" does not show correct functions for CPU profiling using Java app (scimark2). (3497)
- For huge source files (like sqlite3.c), CodeXL source view does not show the complete source code - View seems to limit to 64K lines (3541)
- Samples not attributed to source for functions that belong to huge (100K+ lines) source file (3542)
- On AMD Ryzen, CPU Profiler does not support pre-defined profile configurations. User has to use the Custom Profiler to select the required PMC or IBS events.
- On AMD Ryzen, selecting multiple PMC or IBS events to perform CPU profiling may not work properly.
- On AMD Ryzen, IBS Profiling may not be enabled by default. In that case, IBS can be enabled through BIOS settings.
- On Linux OS, CPU Profiler may show zero samples for IBS Fetch event. (3773)
- Samples reported differs in Overview tab and Callgraph view. (3785)
- CodeXL displays empty source view if debug information (.pdb) is not present for the profiled application. (3566)
- Visual Studio plugin crashes on running power profile session by "New Power Session..." (3908)
- Source view for Java inline functions shows no samples for the source. (3912)
- Installing APP SDK will break GPU kernel debugging. (3815)

Support

Please use our [CodeXL Issues Page](#) for bug reports, support and feature requests.