



NVIDIA CUDA TOOLKIT 10.0.153

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Release Notes for Windows, Linux, and Mac OS



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Chapter 1.

CUDA TOOLKIT MAJOR COMPONENTS

This section provides an overview of the major components of the CUDA Toolkit and points to their locations after installation.

Compiler

The CUDA-C and CUDA-C++ compiler, **nvcc**, is found in the **bin/** directory. It is built on top of the NVVM optimizer, which is itself built on top of the LLVM compiler infrastructure. Developers who want to target NVVM directly can do so using the Compiler SDK, which is available in the **nvvm/** directory.

Please note that the following files are compiler-internal and subject to change without any prior notice.

- ▶ any file in **include/crt** and **bin/crt**
- ▶ **include/common_functions.h**, **include/device_double_functions.h**, **include/device_functions.h**, **include/host_config.h**, **include/host_defines.h**, and **include/math_functions.h**
- ▶ **nvvm/bin/cicc**
- ▶ **bin/cudafe++**, **bin/bin2c**, and **bin/fatbinary**

Tools

The following development tools are available in the **bin/** directory (except for Nsight Visual Studio Edition (VSE) which is installed as a plug-in to Microsoft Visual Studio).

- ▶ IDEs: **nsight** (Linux, Mac), Nsight VSE (Windows)
- ▶ Debuggers: **cuda-memcheck**, **cuda-gdb** (Linux), Nsight VSE (Windows)
- ▶ Profilers: **nvprof**, **nvvp**, Nsight VSE (Windows)
- ▶ Utilities: **cuobjdump**, **nvdiasm**, **gpu-library-advisor**

Libraries

The scientific and utility libraries listed below are available in the **lib/** directory (DLLs on Windows are in **bin/**), and their interfaces are available in the **include/** directory.

- ▶ **cublas** (BLAS)
- ▶ **cublas_device** (BLAS Kernel Interface)
- ▶ **cuda_occupancy** (Kernel Occupancy Calculation [header file implementation])

- ▶ **cuda devrt** (CUDA Device Runtime)
- ▶ **cuda rt** (CUDA Runtime)
- ▶ **cufft** (Fast Fourier Transform [FFT])
- ▶ **cupti** (Profiling Tools Interface)
- ▶ **curand** (Random Number Generation)
- ▶ **cusolver** (Dense and Sparse Direct Linear Solvers and Eigen Solvers)
- ▶ **cuspars** (Sparse Matrix)
- ▶ **npp** (NVIDIA Performance Primitives [image and signal processing])
- ▶ **nvblas** ("Drop-in" BLAS)
- ▶ **nvcuvid** (CUDA Video Decoder [Windows, Linux])
- ▶ **nvgraph** (CUDA nvGRAPH [accelerated graph analytics])
- ▶ **nvml** (NVIDIA Management Library)
- ▶ **nvrtc** (CUDA Runtime Compilation)
- ▶ **nvtx** (NVIDIA Tools Extension)
- ▶ **thrust** (Parallel Algorithm Library [header file implementation])

CUDA Samples

Code samples that illustrate how to use various CUDA and library APIs are available in the **samples/** directory on Linux and Mac, and are installed to **C:\ProgramData\NVIDIA Corporation\CUDA Samples** on Windows. On Linux and Mac, the **samples/** directory is read-only and the samples must be copied to another location if they are to be modified. Further instructions can be found in the *Getting Started Guides* for Linux and Mac.

Documentation

The most current version of these release notes can be found online at <http://docs.nvidia.com/cuda/cuda-toolkit-release-notes/index.html>. Also, the **version.txt** file in the root directory of the toolkit will contain the version and build number of the installed toolkit.

Documentation can be found in PDF form in the **doc/pdf/** directory, or in HTML form at **doc/html/index.html** and online at <http://docs.nvidia.com/cuda/index.html>.

CUDA Driver

Running a CUDA application requires the system with at least one CUDA capable GPU and a driver that is compatible with the CUDA Toolkit. For more information various GPU products that are CUDA capable, visit <https://developer.nvidia.com/cuda-gpus>. Each release of the CUDA Toolkit requires a minimum version of the CUDA driver. The CUDA driver is backward compatible, meaning that applications compiled against a particular version of the CUDA will continue to work on subsequent (later) driver releases. More information on compatibility can be found at <https://docs.nvidia.com/cuda/cuda-c-best-practices-guide/index.html#cuda-runtime-and-driver-api-version>.

Table 1 CUDA Toolkit and Compatible Driver Versions

CUDA Toolkit	Linux x86_64 Driver Version	Windows x86_64 Driver Version
CUDA 7.0 (7.0.28)	>= 346.46	>= 347.62

CUDA Toolkit	Linux x86_64 Driver Version	Windows x86_64 Driver Version
CUDA 7.5 (7.5.16)	>= 352.31	>= 353.66
CUDA 8.0 (8.0.44)	>= 367.48	>= 369.30
CUDA 8.0 (8.0.61 GA2)	>= 375.26	>= 376.51
CUDA 9.0 (9.0.76)	>= 384.81	>= 385.54
CUDA 9.1 (9.1.85)	>= 390.46	>= 391.29
CUDA 9.2 (9.2.88)	>= 396.26	>= 397.44
CUDA 9.2 (9.2.148 Update 1)	>= 396.37	>= 398.26

For convenience, the NVIDIA driver is installed as part of the CUDA Toolkit installation. Note that this driver is for development purposes and is not recommended for use in production with Tesla GPUs. For running CUDA applications in production with Tesla GPUs, it is recommended to download the latest driver for Tesla GPUs from the NVIDIA driver downloads site at <http://www.nvidia.com/drivers>.

During the installation of the CUDA Toolkit, the installation of the NVIDIA driver may be skipped on Windows (when using the interactive or silent installation) or on Linux (by using meta packages). For more information on customizing the install process on Windows, see <http://docs.nvidia.com/cuda/cuda-installation-guide-microsoft-windows/index.html#install-cuda-software>. For meta packages on Linux, see <https://docs.nvidia.com/cuda/cuda-installation-guide-linux/index.html#package-manager-metas>

CUDA-GDB Sources

CUDA-GDB sources are available as follows:

- ▶ For CUDA Toolkit 7.0 and newer, in the installation directory **extras/**. The directory is created by default during the toolkit installation unless the **.rpm** or **.deb** package installer is used. In this case, the **cuda-gdb-src** package must be manually installed.
- ▶ For CUDA Toolkit 6.5, 6.0, and 5.5, at <https://github.com/NVIDIA/cuda-gdb>.
- ▶ For CUDA Toolkit 5.0 and earlier, at <ftp://download.nvidia.com/CUDAOpen64/>.
- ▶ Upon request by sending an e-mail to <mailto:oss-requests@nvidia.com>.

Chapter 2. RELEASE NOTES

The release notes for the CUDA Toolkit can be found online at <http://docs.nvidia.com/cuda/cuda-toolkit-release-notes/index.html>.

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