



# COMPUTE SANITIZER

v2022.2.0 | April 2022

## Release Notes





# TABLE OF CONTENTS

<b>Chapter 1. Release Notes.....</b>	<b>1</b>
1.1. Updates in 2022.2.....	1
1.2. Updates in 2022.1.1.....	1
1.3. Updates in 2022.1.....	1
1.4. Updates in 2021.3.1.....	2
1.5. Updates in 2021.3.....	2
1.6. Updates in 2021.2.1.....	2
1.7. Updates in 2021.2.....	2
1.8. Updates in 2021.1.1.....	3
1.9. Updates in 2021.1.....	3
1.10. Updates in 2020.3.1.....	3
1.11. Updates in 2020.3.....	3
1.12. Updates in 2020.2.1.....	3
1.13. Updates in 2020.2.....	3
1.14. Updates in 2020.1.2.....	4
1.15. Updates in 2020.1.1.....	4
1.16. Updates in 2020.1.....	4
1.17. Updates in 2019.1.....	4
<b>Chapter 2. Known Limitations.....</b>	<b>5</b>
<b>Chapter 3. Known Issues.....</b>	<b>6</b>
<b>Chapter 4. Support.....</b>	<b>7</b>
4.1. Platform Support.....	7
4.2. GPU Support.....	7



## LIST OF TABLES

Table 1	Platforms supported by Compute Sanitizer .....	7
Table 2	GPU architectures supported by Compute Sanitizer .....	7







# Chapter 1.

## RELEASE NOTES

### 1.1. Updates in 2022.2

- ▶ Added memcheck support for use-before-alloc and use-after-free race detection. See the [stream-ordered race detection documentation](#) for more information.
- ▶ Added leakcheck support for asynchronous allocations, OptiX resources and CUDA memmap (on Linux only for the latter).
- ▶ Added option to ignore `CUDA_ERROR_NOT_FOUND` error codes returned by the `cuGetProcAddress` API.
- ▶ Added new public API functions to allocate and free page-locked host memory.
- ▶ Added public API callbacks for the [event management](#) API.

### 1.2. Updates in 2022.1.1

- ▶ Fixed initcheck issue where the tool would incorrectly abort a CUDA kernel launch after reporting an uninitialized access on Windows with hardware scheduling enabled.

### 1.3. Updates in 2022.1

- ▶ Added support for generating coredumps.
- ▶ Improved support for stack overflow detection.
- ▶ Added new option `--target-processes-filter` to filter the processes being tracked by name.
- ▶ Added initcheck support for asynchronous allocations. Requires CUDA driver version 510 or newer.
- ▶ Added initcheck support for accesses on peer devices. Requires CUDA driver version 510 or newer.
- ▶ Added support for OptiX 7 applications.



- ▶ Added support for tracking the child processes of 32-bit processes in multi-process applications on Linux and Windows x86\_64.

## 1.4. Updates in 2021.3.1

- ▶ Fixed intermittent issue on vGPU where synccheck would incorrectly detect divergent threads.
- ▶ Fixed potential hang when tracking several graph launches.

## 1.5. Updates in 2021.3

- ▶ Improved Linux host backtrace.
- ▶ Removed requirement to call `cudaDeviceReset()` for accurate reporting of memory leaks and unused memory features.
- ▶ Fixed synccheck potential hang when calling `__syncthreads` in divergent code paths on Volta GPUs or newer.
- ▶ Added print of nearest allocation information for memcheck precise errors in global memory.
- ▶ Added warning when calling device-side `malloc` with an empty size.
- ▶ Added separate public API device callback for `cuda::memcpy_async`.
- ▶ Added new command-line option `--num-cuda-barriers` to override the expected number of `cuda::barrier` used by the target application.
- ▶ Added new command-line options `--print-session-details` to print session information and `--save-session-details` to save it to the output file.
- ▶ Added support for WSL2.

## 1.6. Updates in 2021.2.1

- ▶ Added device backtrace for malloc/free errors in CUDA kernels.
- ▶ Improved racecheck host memory footprint.

## 1.7. Updates in 2021.2

- ▶ Added racecheck and synccheck support for `cuda::barrier` on Ampere GPUs or newer.
- ▶ Added racecheck support for `__syncwarp` with partial mask.
- ▶ Added `--launch-count` and `--launch-skip` filtering options. See the [Command Line Options documentation](#) for more information.
- ▶ `--filter` and `--exclude` options have been respectively renamed to `--kernel-regex` and `--kernel-regex-exclude`.
- ▶ Added support for QNX and Linux aarch64 platforms.
- ▶ Added support for CUDA graphs memory nodes.



## 1.8. Updates in 2021.1.1

- ▶ Fixed an issue where incorrect line numbers could be shown in errors reports.

## 1.9. Updates in 2021.1

- ▶ Added support for allocation padding via the `--padding` option.
- ▶ Added experimental support for NVTX memory API using option `--nvtx yes`. Please refer to [NVTX API for Compute Sanitizer Reference Manual](#) for more information.

## 1.10. Updates in 2020.3.1

- ▶ Fixed issue when launching a CUDA graph multiple times.
- ▶ Fixed false positives when using cooperative groups synchronization primitives with `initcheck` and `synccheck`.

## 1.11. Updates in 2020.3

- ▶ Added support for CUDA memory pools and CUDA API reduced serialization.
- ▶ Added host backtrace for unused memory reports.

## 1.12. Updates in 2020.2.1

- ▶ Fixed crash when loading cubins of size larger than 2 GiB.
- ▶ Fixed error detection on systems with multiple GPUs.
- ▶ Fixed issue when using CUDA Virtual Memory Management API `cuMemSetAccess` to remove access to a subset of devices on a system with multiple GPUs.
- ▶ Added public API to translate between sanitizer and CUDA stream handles.

## 1.13. Updates in 2020.2

- ▶ Added support for CUDA graphs and CUDA memmap APIs.
- ▶ The memory access callback of the public API has been split into three distinct callbacks corresponding to global, shared and local memory accesses.



## 1.14. Updates in 2020.1.2

- ▶ Added sanitizer stream API. This fixes tool crashes when per-thread streams are being used.

## 1.15. Updates in 2020.1.1

- ▶ Added support for Windows Hardware-accelerated GPU scheduling
- ▶ Added support for tracking child processes spawned by the application launched under the tool via the `--target-processes` CLI option.

## 1.16. Updates in 2020.1

- ▶ Initial release of the Compute Sanitizer (with CUDA 11.0)

Updates to the Sanitizer API :

- ▶ Added support for per-thread streams
- ▶ Added APIs to retrieve the PC and size of a CUDA function or patch
- ▶ Added callback for `cudaStreamAttachMemAsync`
- ▶ Added direction to memcpy callback data
- ▶ Added stream to memcpy and memset callbacks data
- ▶ Added launch callback after syscall setup
- ▶ Added visibility field to allocation callback data
- ▶ Added PC argument to block entry callback
- ▶ Added incoming value to memory access callbacks
- ▶ Added threadCount to barrier callbacks
- ▶ Added cooperative group flags for barrier and function callbacks

## 1.17. Updates in 2019.1

- ▶ Initial release of the Compute Sanitizer API (with CUDA 10.1)



## Chapter 2.

# KNOWN LIMITATIONS

- ▶ Applications run much slower under the Compute Sanitizer tools. This may cause some kernel launches to fail with a launch timeout error when running with the Compute Sanitizer enabled.
- ▶ Compute Sanitizer tools do not support device backtrace on Maxwell devices (SM 5.x).
- ▶ Compute Sanitizer tools do not support device backtrace on Windows Server 2016 for devices in WDDM mode.
- ▶ Compute Sanitizer tools do not support device backtrace and coredumps on WSL2.
- ▶ Compute Sanitizer tools do not support CUDA/Direct3D interop.
- ▶ Compute Sanitizer tools do not support CUDA/Vulkan interop.
- ▶ The memcheck tool does not support CUDA API error checking for API calls made on the GPU using dynamic parallelism.
- ▶ The racecheck, synccheck and initcheck tools do not support CUDA dynamic parallelism.
- ▶ CUDA dynamic parallelism is not supported when Windows Hardware-accelerated GPU scheduling is enabled.
- ▶ Compute Sanitizer tools cannot interoperate with other CUDA developer tools. This includes CUDA coredumps which are automatically disabled by the Compute Sanitizer. They can be enabled instead by using the **--generate-coredump** option.
- ▶ Compute Sanitizer tools do not support IPC memory pools. Using it will result in false positives.
- ▶ Compute Sanitizer tools are not supported when SLI is enabled.
- ▶ Compute Sanitizer tools do not support lazy kernel loading, which will automatically be disabled.



## Chapter 3.

# KNOWN ISSUES

- ▶ The racecheck tool may print incorrect data for "Current value" when reporting a hazard on a shared memory location where the last access was an atomic operation. This can also impact the severity of this hazard.
- ▶ With some versions of Windows Server 2016, programs built with some configurations might hang when used with the Compute Sanitizer. A workaround for this issue is to use the Computer Sanitizer with **--show-backtrace device** or **--show-backtrace no** options.
- ▶ On QNX, when using the **--target-processes all** option, analyzing shell scripts may hang after the script has completed. End the application using *Ctrl-C* on the command line in that case.
- ▶ The initcheck tool might report false positives for device-to-host `cudaMemcpy` operations on padded structs that were initialized by a CUDA kernel. The **#pragma pack** directive can be used to disable the padding as a workaround.



# Chapter 4.

## SUPPORT

Information on supported platforms and GPUs.

### 4.1. Platform Support

Table 1 Platforms supported by Compute Sanitizer

Platform	Support
Windows	Yes
Linux (x86_64)	Yes
Linux (ppc64le)	Yes
Linux (aarch64bsa)	Yes
Linux (aarch64)	Yes
QNX	Yes
MacOSX	No

### 4.2. GPU Support

Table 2 GPU architectures supported by Compute Sanitizer

Architecture	Support
Kepler	No
Maxwell	Yes
Pascal	Yes
Volta	Yes
Turing	Yes
Ampere	Yes



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