COMPUTE SANITIZER

v2022.1.1 | January 2022

Release Notes
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Chapter 1.
RELEASE NOTES

1.1. Updates in 2022.1.1

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

1.2. Updates in 2022.1

- Add support for generating coredumps.
- Improve support for stack overflow detection.
- Added new option `--target-processes-filter` to filter the processes being tracked by name.
- Initcheck support for asynchronous allocations. Requires CUDA driver version 510 or newer.
- 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.

1.3. Updates in 2021.3.1

- Fix intermittent issue on vGPU where synccheck would incorrectly detect divergent threads.
- Fix potential hang when tracking several graph launches.
1.4. Updates in 2021.3

- Improved Linux host backtrace.
- Remove requirement to call `cudaDeviceReset()` for accurate reporting of memory leaks and unused memory features.
- Fix syncheck potential hang when calling `__syncthreads` in divergent code paths on Volta GPUs or newer.
- Print nearest allocation information for memcheck precise errors in global memory.
- Add warning when calling device-side `malloc` with an empty size.
- Add separate public API device callback for `cuda::memcpy_async`.
- Add 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.

1.5. Updates in 2021.2.1

- Add device backtrace for malloc/free errors in CUDA kernels.
- Improve racecheck host memory footprint.

1.6. Updates in 2021.2

- Added racecheck and syncheck 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.

1.7. Updates in 2021.1.1

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

1.8. Updates in 2021.1

- Support for allocation padding via the `--padding` option.

### 1.9. 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.

### 1.10. Updates in 2020.3

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

### 1.11. 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.

### 1.12. 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.

### 1.13. Updates in 2020.1.2

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

### 1.14. Updates in 2020.1.1

- Support for Windows Hardware-accelerated GPU scheduling
- Support for tracking child processes spawned by the application launched under the tool via the `--target-processes` CLI option.
1.15. 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

1.16. 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 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.
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

<table>
<thead>
<tr>
<th>Platform</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>Yes</td>
</tr>
<tr>
<td>Linux (x86_64)</td>
<td>Yes</td>
</tr>
<tr>
<td>Linux (ppc64le)</td>
<td>Yes</td>
</tr>
<tr>
<td>Linux (aarch64bsa)</td>
<td>Yes</td>
</tr>
<tr>
<td>Linux (aarch64)</td>
<td>Yes</td>
</tr>
<tr>
<td>QNX</td>
<td>Yes</td>
</tr>
<tr>
<td>MacOSX</td>
<td>No</td>
</tr>
</tbody>
</table>

4.2. GPU Support

Table 2 GPU architectures supported by Compute Sanitizer

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kepler</td>
<td>No</td>
</tr>
<tr>
<td>Maxwell</td>
<td>Yes</td>
</tr>
<tr>
<td>Pascal</td>
<td>Yes</td>
</tr>
<tr>
<td>Volta</td>
<td>Yes</td>
</tr>
<tr>
<td>Turing</td>
<td>Yes</td>
</tr>
<tr>
<td>Ampere</td>
<td>Yes</td>
</tr>
</tbody>
</table>
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