Lenovo Global Technology
NVIDIA Tesla A100-PCIE-40GB
ThinkSystem SR655

SPECaccel_ocl_peak = 18.2
SPECaccel_ocl_base = 15.8

ACCEL license: 28
Test sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test date: May-2021
Hardware Availability: Jun-2021
Software Availability: Jun-2021

SPECaccel_ocl_peak = 18.2
SPECaccel_ocl_base = 15.8

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## SPEC ACCEL OCL Result

**Lenovo Global Technology**  
**NVIDIA Tesla A100-PCIE-40GB**  
**ThinkSystem SR655**

### Hardware

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>AMD EPYC 7763</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Turbo up to 3.5 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2450</td>
</tr>
<tr>
<td>CPU MHz Maximum</td>
<td>3500</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>64 cores, 1 chip, 64 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1 chip</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>512 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache</td>
<td>256 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB (8 x 32 GB 2Rx8 PC4-3200AA-R)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 480 GB 2.5&quot; SSD</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
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### Accelerator

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Accel Model Name</td>
<td>NVIDIA Tesla A100-PCIE-40GB</td>
</tr>
<tr>
<td>Accel Vendor</td>
<td>NVIDIA Corporation</td>
</tr>
<tr>
<td>Accel Name</td>
<td>NVIDIA Tesla A100-PCIE-40GB</td>
</tr>
<tr>
<td>Type of Accel</td>
<td>GPU</td>
</tr>
<tr>
<td>Accel Connection</td>
<td>PCIe 4.0 16x</td>
</tr>
<tr>
<td>Does Accel Use ECC</td>
<td>Yes</td>
</tr>
<tr>
<td>Accel Description</td>
<td>NVIDIA Tesla A100-PCIE-40GB</td>
</tr>
<tr>
<td>Accel Driver</td>
<td>NVIDIA UNIX x86_64 Kernel Module 450.51.05</td>
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</table>

### Software

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.el8.x86_64</td>
</tr>
<tr>
<td>Compiler</td>
<td>Nvidia HPC SDK Release 21.3</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3</td>
</tr>
<tr>
<td>Other Software</td>
<td>CUDA 11.0 SDK</td>
</tr>
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</table>
Lenovo Global Technology
NVIDIA Tesla A100-PCIE-40GB
ThinkSystem SR655

**SPECaccel_ocl_peak = 18.2**
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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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<tbody>
<tr>
<td></td>
<td>Base Seconds</td>
<td>Base Ratio</td>
<td>Peak Seconds</td>
<td>Peak Ratio</td>
</tr>
<tr>
<td>101.tpacf</td>
<td>6.02</td>
<td>17.8</td>
<td>3.70</td>
<td>28.9</td>
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<tr>
<td>103.stencil</td>
<td>4.84</td>
<td>25.8</td>
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<td>25.8</td>
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<td>104.lbm</td>
<td>4.25</td>
<td>26.3</td>
<td>4.24</td>
<td>26.4</td>
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<td>110.fft</td>
<td>4.46</td>
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<td>4.46</td>
<td>24.9</td>
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<td>112.spmv</td>
<td>12.5</td>
<td>11.8</td>
<td>12.5</td>
<td>11.8</td>
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<td>114.mriq</td>
<td>2.73</td>
<td>39.9</td>
<td>2.73</td>
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<td>116.histo</td>
<td>32.5</td>
<td>3.50</td>
<td>32.5</td>
<td>3.50</td>
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<tr>
<td>117.bfs</td>
<td>5.36</td>
<td>21.8</td>
<td>5.85</td>
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<td>118.cutcp</td>
<td>3.36</td>
<td>29.5</td>
<td>3.36</td>
<td>29.5</td>
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<td>120.kmeans</td>
<td>31.5</td>
<td>3.17</td>
<td>31.6</td>
<td>3.16</td>
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<td>121.lavamd</td>
<td>4.44</td>
<td>24.5</td>
<td>4.44</td>
<td>24.5</td>
</tr>
<tr>
<td>122.cfd</td>
<td>8.17</td>
<td>15.4</td>
<td>8.10</td>
<td>15.6</td>
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<tr>
<td>123.nw</td>
<td>13.8</td>
<td>8.31</td>
<td>13.8</td>
<td>8.31</td>
</tr>
<tr>
<td>124.hotspot</td>
<td>5.75</td>
<td>19.8</td>
<td>5.75</td>
<td>19.8</td>
</tr>
<tr>
<td>125.lud</td>
<td>9.02</td>
<td>13.2</td>
<td>9.02</td>
<td>13.2</td>
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<tr>
<td>126.ge</td>
<td>6.27</td>
<td>24.7</td>
<td>6.27</td>
<td>24.7</td>
</tr>
<tr>
<td>127.srad</td>
<td>8.01</td>
<td>14.2</td>
<td>8.01</td>
<td>14.2</td>
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<tr>
<td>128.heartwall</td>
<td>8.75</td>
<td>12.1</td>
<td>8.75</td>
<td>12.1</td>
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<tr>
<td>140.bplustree</td>
<td>6.09</td>
<td>17.7</td>
<td>6.09</td>
<td>17.7</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

**Submit Notes**

The config file option 'submit' was used.

**Platform Notes**

Sysinfo program /home/ACCEL1.3/Docs/sysinfo
$Rev: 6965 $ $Date:: 2015-04-21 #$ c05a7f14b1b1765e3fe1df68447e8a35
running on amd2srh833 Tue May 11 20:26:42 2021

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
http://www.spec.org/accel/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : AMD EPYC 7763 64-Core Processor
Continued on next page
## Platform Notes (Continued)

1 "physical id"s (chips)
64 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 64
siblings : 64
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46
47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
cache size : 512 KB

From /proc/meminfo
MemTotal:       263708564 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
os-release:
   NAME="Red Hat Enterprise Linux"
   VERSION="8.3 (Ootpa)"
   ID="rhel"
   ID_LIKE="fedora"
   VERSION_ID="8.3"
   PLATFORM_ID="platform:el8"
   PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
   ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
uname -a:
   Linux amd2srh833 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
      x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 13 11:28

SPEC is set to: /home/ACCEL1.3

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs   419G  76G  343G  19% /home

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Lenovo
Memory: CFE125L 03/26/2021

Continued on next page
### Lenovo Global Technology  
**NVIDIA Tesla A100-PCIE-40GB**  
**ThinkSystem SR655**

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<tr>
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<td>Hardware Availability:</td>
<td>Jun-2021</td>
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<td>Software Availability:</td>
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### SPECaccel_ocl_peak = 18.2

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#### General Notes

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

#### Base Runtime Environment

- **C benchmarks**
  - OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 11.0.197
  - OpenCL Device #0: A100-PCIE-40GB, v 450.51.05

- **C++ benchmarks**
  - OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 11.0.197
  - OpenCL Device #0: A100-PCIE-40GB, v 450.51.05

#### Base Compiler Invocation

- **C benchmarks**:
  - nvc

- **C++ benchmarks**:
  - nvc++

#### Base Portability Flags

116.histo: -DSPEC_LOCAL_MEMORY_HEADROOM=1

#### Base Optimization Flags

- **C benchmarks**: 
  - -fast -Mstack_arrays -Mnouniform -Mfprelaxed

(Continued on next page)
## Lenovo Global Technology

### NVIDIA Tesla A100-PCIE-40GB

ThinkSystem SR655

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**ACCEL license:** 28  
**Test sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

### Base Optimization Flags (Continued)

C++ benchmarks:
- `-fast`  
- `-Mstack_arrays`  
- `-Mnouniform`  
- `-Mfprelaxed`

### Base Other Flags

C benchmarks:
- `-I/usr/local/cuda-11.0/include`  
- `-L/usr/local/cuda-11.0/lib64`  
- `-lOpenCL`

C++ benchmarks:
- `-I/usr/local/cuda-11.0/include`  
- `-L/usr/local/cuda-11.0/lib64`  
- `-lOpenCL`

### Peak Runtime Environment

C benchmarks:
- OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 11.0.197  
  - OpenCL Device #0: A100-PCIE-40GB, v 450.51.05

C++ benchmarks:
- OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 11.0.197  
  - OpenCL Device #0: A100-PCIE-40GB, v 450.51.05

### Peak Compiler Invocation

C benchmarks:
- `nvc`

C++ benchmarks:
- `nvc++`

### Peak Portability Flags

116.histo: 
- `-DSPEC_LOCAL_MEMORY_HEADROOM=1`

### Peak Optimization Flags

C benchmarks:

Continued on next page
Lenovo Global Technology
NVIDIA Tesla A100-PCIE-40GB
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<tr>
<td>Software Availability:</td>
<td>Jun-2021</td>
</tr>
</tbody>
</table>

**Peak Optimization Flags (Continued)**

110.fft: basepeak = yes
114.mriq: basepeak = yes
116.histo: basepeak = yes
117.bfs: 
- `-fast` -Mstack_arrays -Mnouniform -Mfprelaxed
- `-DSPEC_ACCEL_WG_SIZE_0_0=64` `-DSPEC_ACCEL_WG_SIZE_1_0=64`
118.cutcp: basepeak = yes
121.lavamd: basepeak = yes
124.hotspot: basepeak = yes
127.srad: basepeak = yes
128.heartwall: basepeak = yes
140.bplustree: basepeak = yes

**C++ benchmarks:**

101.tpacf: 
- `-fast` -Mstack_arrays -Mnouniform -Mfprelaxed
- `-DSPEC_ACCEL_WG_SIZE_0_0=1024`
103.stencil: basepeak = yes
104.lbm: 
- `-fast` -Mstack_arrays -Mnouniform -Mfprelaxed
- `-DSPEC_ACCEL_WG_SIZE_0_0=32` `-DSPEC_ACCEL_WG_SIZE_0_1=1`
- `-DSPEC_ACCEL_WG_SIZE_0_2=1`
112.spmv: 
- `-fast` -Mstack_arrays -Mnouniform -Mfprelaxed
- `-DSPEC_ACCEL_WG_SIZE_0_0=96`
120.kmeans: 
- `-fast` -Mstack_arrays -Mnouniform -Mfprelaxed
- `-DSPEC_ACCEL_WG_SIZE_0_0=288`
122.cfd: 
- `-fast` -Mstack_arrays -Mnouniform -Mfprelaxed
- `-DSPEC_ACCEL_WG_SIZE_0_3=288`
123.nw: basepeak = yes
125.lud: 
- `-fast` -Mstack_arrays -Mnouniform -Mfprelaxed
- `-DSPEC_ACCEL_WG_SIZE_0_0=32`
126.ge: 
- `-fast` -Mstack_arrays -Mnouniform -Mfprelaxed
- `-DSPEC_ACCEL_WG_SIZE_0_0=512` `-DSPEC_ACCEL_WG_SIZE_1_0=1`
- `-DSPEC_ACCEL_WG_SIZE_1_1=512`
## Lenovo Global Technology
### NVIDIA Tesla A100-PCIE-40GB
#### ThinkSystem SR655

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</tbody>
</table>

### Test Details
- **Test date:** May-2021
- **Hardware Availability:** Jun-2021
- **Software Availability:** Jun-2021

### Peak Other Flags

**C benchmarks:**
- `-I/usr/local/cuda-11.0/include -L/usr/local/cuda-11.0/lib64 -lOpenCL`

**C++ benchmarks:**
- `-I/usr/local/cuda-11.0/include -L/usr/local/cuda-11.0/lib64 -lOpenCL`

The flags file that was used to format this result can be browsed at [https://www.spec.org/accel/flags/nvidia_flags.20210608.html](https://www.spec.org/accel/flags/nvidia_flags.20210608.html)

You can also download the XML flags source by saving the following link:
[https://www.spec.org/accel/flags/nvidia_flags.20210608.xml](https://www.spec.org/accel/flags/nvidia_flags.20210608.xml)