SPEC ACCEL™ OCL Result

Copyright 2015-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology

NVIDIA Tesla A100-PCIE-40GB

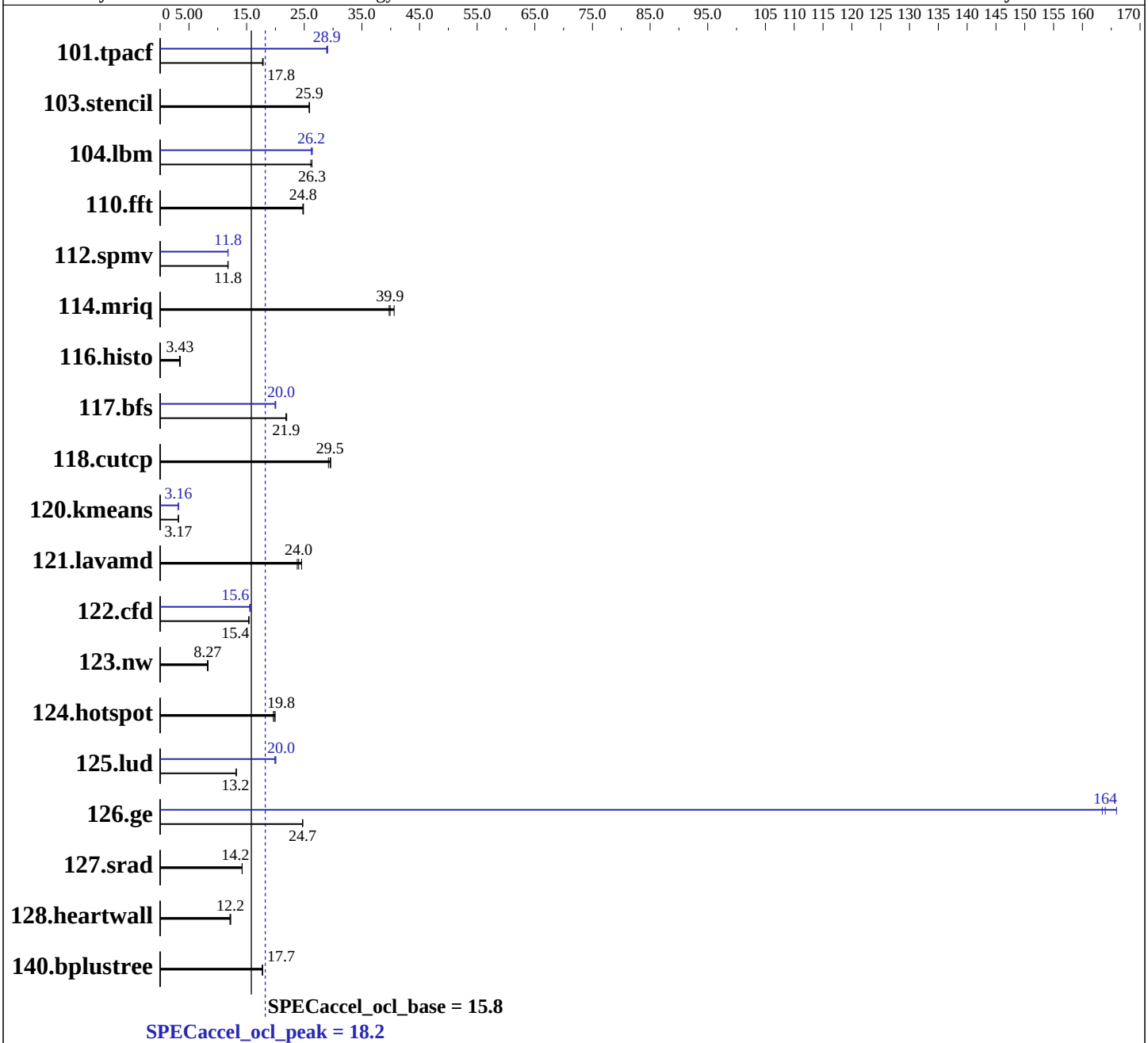
ThinkSystem SR655

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



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Hardware

CPU Name:	AMD EPYC 7763
CPU Characteristics:	Turbo up to 3.5 GHz
CPU MHz:	2450
CPU MHz Maximum:	3500
FPU:	Integrated
CPU(s) enabled:	64 cores, 1 chip, 64 cores/chip
CPU(s) orderable:	1 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	512 KB I+D on chip per core
L3 Cache:	256 MB I+D on chip per chip 32 MB shared / 8 cores
Other Cache:	None
Memory:	256 GB (8 x 32 GB 2Rx8 PC4-3200AA-R)
Disk Subsystem:	1 x 480 GB 2.5" SSD
Other Hardware:	None

Accelerator

Accel Model Name:	NVIDIA Tesla A100-PCIE-40GB
Accel Vendor:	NVIDIA Corporation
Accel Name:	NVIDIA Tesla A100-PCIE-40GB
Type of Accel:	GPU
Accel Connection:	PCIe 4.0 16x
Does Accel Use ECC:	Yes
Accel Description:	NVIDIA Tesla A100-PCIE-40GB
Accel Driver:	NVIDIA UNIX x86_64 Kernel Module 450.51.05

Software

Operating System:	Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.el8.x86_64
Compiler:	Nvidia HPC SDK Release 21.3
File System:	xfs
System State:	Run level 3
Other Software:	CUDA 11.0 SDK

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
101.tpacf	6.02	17.8	**6.00**	**17.8**	5.99	17.9	3.70	28.9	3.68	29.1	**3.70**	**28.9**
103.stencil	4.84	25.8	**4.82**	**25.9**	4.82	25.9	4.84	25.8	**4.82**	**25.9**	4.82	25.9
104.lbm	**4.25**	**26.3**	4.25	26.3	4.29	26.1	4.24	26.4	**4.27**	**26.2**	4.27	26.2
110.fft	4.46	24.9	**4.47**	**24.8**	4.48	24.8	4.46	24.9	**4.47**	**24.8**	4.48	24.8
112.spmv	12.5	11.8	12.5	11.7	**12.5**	**11.8**	12.5	11.8	12.5	11.8	**12.5**	**11.8**
114.mriq	**2.73**	**39.9**	2.68	40.6	2.74	39.7	**2.73**	**39.9**	2.68	40.6	2.74	39.7
116.histo	32.5	3.50	33.9	3.36	**33.2**	**3.43**	32.5	3.50	33.9	3.36	**33.2**	**3.43**
117.bfs	5.36	21.8	5.33	22.0	**5.35**	**21.9**	**5.85**	**20.0**	5.87	19.9	5.83	20.1
118.cutcp	**3.36**	**29.5**	3.39	29.2	3.34	29.6	**3.36**	**29.5**	3.39	29.2	3.34	29.6
120.kmeans	31.5	3.17	31.9	3.14	**31.6**	**3.17**	**31.6**	**3.16**	31.7	3.15	31.6	3.17
121.lavamd	4.44	24.5	**4.53**	**24.0**	4.58	23.8	4.44	24.5	**4.53**	**24.0**	4.58	23.8
122.cfd	8.17	15.4	8.21	15.4	**8.19**	**15.4**	8.10	15.6	8.06	15.6	**8.10**	**15.6**
123.nw	13.8	8.31	14.0	8.19	**13.9**	**8.27**	13.8	8.31	14.0	8.19	**13.9**	**8.27**
124.hotspot	**5.75**	**19.8**	5.71	20.0	5.80	19.6	**5.75**	**19.8**	5.71	20.0	5.80	19.6
125.lud	**9.02**	**13.2**	9.01	13.2	9.02	13.2	**5.96**	**20.0**	5.92	20.1	5.98	19.9
126.ge	**6.27**	**24.7**	6.27	24.7	6.27	24.7	**0.945**	**164**	0.948	163	0.934	166
127.srad	8.01	14.2	**8.01**	**14.2**	8.01	14.2	8.01	14.2	**8.01**	**14.2**	8.01	14.2
128.heartwall	8.75	12.1	**8.68**	**12.2**	8.67	12.2	8.75	12.1	**8.68**	**12.2**	8.67	12.2
140.bplustree	6.09	17.7	6.07	17.8	**6.09**	**17.7**	6.09	17.7	6.07	17.8	**6.09**	**17.7**

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             CFE125L 03/26/2021
  Memory:
```

Continued on next page

Platform Notes (Continued)

```
      8x Samsung M393A4G43AB3-CWE 32 GB 2 rank 3200 MT/s
      8x Unknown Unknown

   (End of data from sysinfo program)
```

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

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

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_3_0=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

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Tested by:	Lenovo Global Technology	**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`

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

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC ACCEL v1.3.
Report generated on Tue Jun 8 09:58:07 2021 by SPEC ACCEL PS/PDF formatter v1290.
Originally published on 8 June 2021.