SPEC ACCEL™ OCL Result

Lenovo Global Technology

NVIDIA Tesla V100-PCIE-16GB

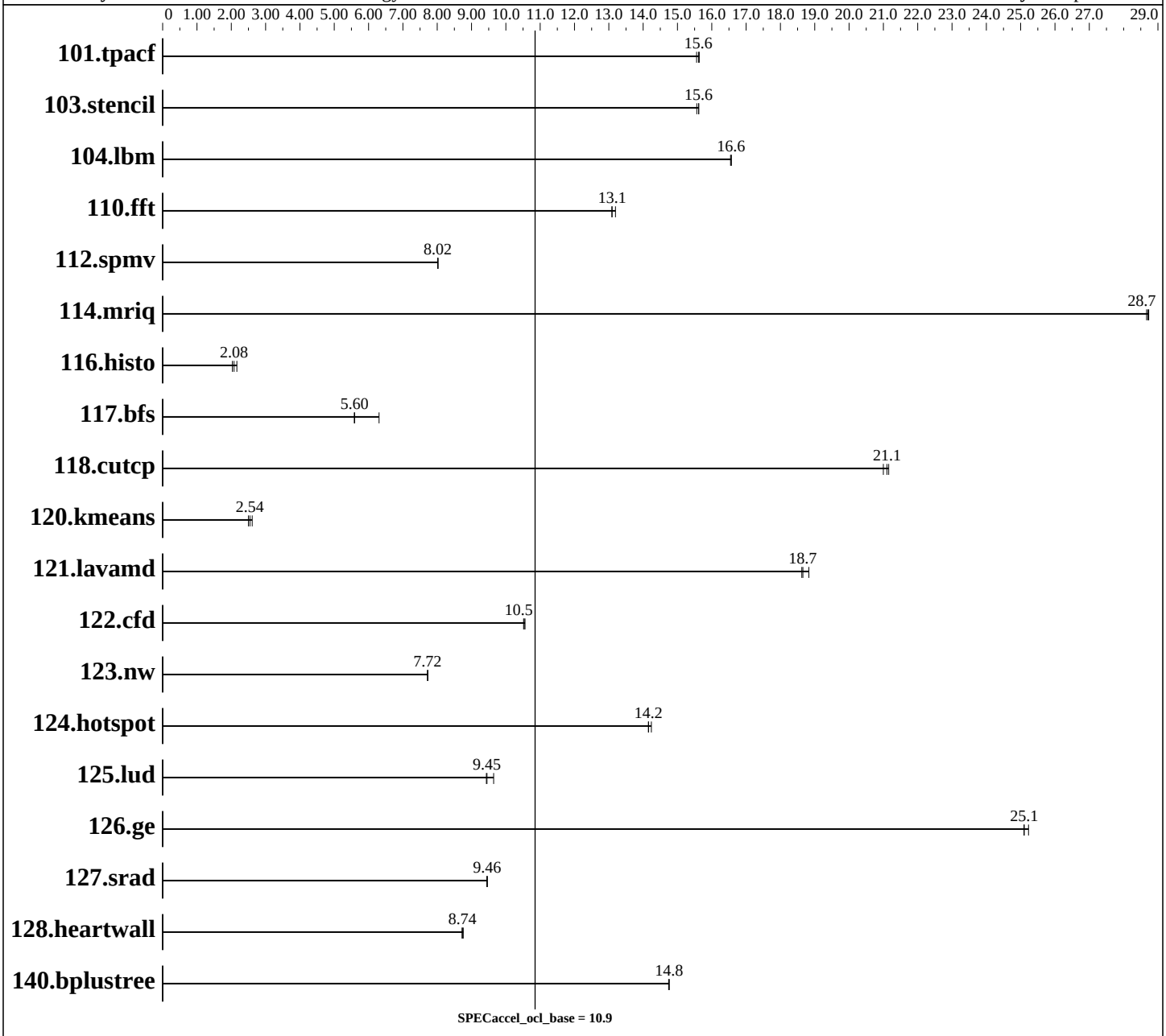
ThinkSystem SR650

SPECaccel_ocl_peak = Not Run

SPECaccel_ocl_base = 10.9

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

Test date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Apr-2019



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Hardware

CPU Name:	Intel Xeon Gold 6240
CPU Characteristics:	
CPU MHz:	2600
CPU MHz Maximum:	3700
FPU:	Integrated
CPU(s) enabled:	32 cores, 2 chips, 16 cores/chip
CPU(s) orderable:	2 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core
L3 Cache:	22 MB I+D on chip per chip
Other Cache:	None
Memory:	768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
Disk Subsystem:	1 X Lenovo 1 TB SAS 2.5" HDD (JBOD)
Other Hardware:	None

Accelerator

Accel Model Name:	Tesla V100
Accel Vendor:	NVIDIA
Accel Name:	NVIDIA Tesla V100-PCIE-16GB
Type of Accel:	GPU
Accel Connection:	PCIe 3.0 16x
Does Accel Use ECC:	Yes
Accel Description:	NVIDIA V100-PCIE-16GB
Accel Driver:	NVIDIA UNIX x86_64 Kernel Module 396.26

Software

Operating System:	Red Hat Enterprise Linux Server release 7.6 (Maipo) 3.10.0-957.el7.x86_64
Compiler:	PGI Accelerator Server Complete, Release 18.7
File System:	xfs
System State:	Run level 3 (Multi User)
Other Software:	CUDA 9.2 SDK

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
101.tpacf	**6.85**	**15.6**	6.84	15.6	6.88	15.6						
103.stencil	8.03	15.6	8.00	15.6	**8.00**	**15.6**						
104.lbm	6.77	16.5	**6.76**	**16.6**	6.76	16.6						
110.fft	**8.48**	**13.1**	8.48	13.1	8.41	13.2						
112.spmv	18.3	8.01	**18.3**	**8.02**	18.3	8.03						
114.mriq	3.79	28.7	3.80	28.7	**3.80**	**28.7**						
116.histo	**54.8**	**2.08**	56.2	2.03	52.7	2.16						
117.bfs	**20.9**	**5.60**	21.0	5.58	18.6	6.31						
118.cutcp	4.71	21.0	**4.69**	**21.1**	4.68	21.2						
120.kmeans	38.3	2.61	40.0	2.50	**39.3**	**2.54**						
121.lavamd	**5.84**	**18.7**	5.79	18.8	5.85	18.6						
122.cfd	12.0	10.5	**12.0**	**10.5**	11.9	10.6						
123.nw	14.9	7.73	14.9	7.72	**14.9**	**7.72**						
124.hotspot	**8.05**	**14.2**	8.01	14.2	8.05	14.2						
125.lud	**12.6**	**9.45**	12.3	9.64	12.6	9.43						
126.ge	6.14	25.2	6.18	25.1	**6.17**	**25.1**						
127.srad	**12.1**	**9.46**	12.1	9.44	12.0	9.46						
128.heartwall	12.1	8.76	12.2	8.72	**12.1**	**8.74**						
140.bplustree	**7.32**	**14.8**	7.32	14.8	7.33	14.7						

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

Platform Notes

```
Sysinfo program /home/ACCEL1.2/Docs/sysinfo
$Rev: 6965 $ $Date:: 2015-04-21 #$ c05a7f14b1b1765e3fe1df68447e8a35
running on slave5 Wed Mar 09 13:46:49 2019

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 : Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
      2 "physical id"s (chips)
      36 "processors"
   cores, siblings (Caution: counting these is hw and system dependent.  The
   following excerpts from /proc/cpuinfo might not be reliable.  Use with
   caution.)
```

Continued on next page

Platform Notes (Continued)

```
        cpu cores : 18
        siblings  : 18
        physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
        physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
     cache size : 25344 KB

  From /proc/meminfo
     MemTotal:       792031348 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="Red Hat Enterprise Linux Server"
        VERSION="7.6 (Maipo)"
        ID="rhel"
        ID_LIKE="fedora"
        VARIANT="Server"
        VARIANT_ID="server"
        VERSION_ID="7.6"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
     redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
     system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:7.6:ga:server

  uname -a:
     Linux slave5 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018 x86_64
     x86_64 x86_64 GNU/Linux

  run-level 3 Mar 09 11:52

  SPEC is set to: /home/ACCEL1.2
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda3      xfs   221G   41G  180G  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 -[IVE135S-2.10]- 03/08/2019
    Memory:
     24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933 MT/s

  (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.
Run nvidia-smi -pm 1 to enable persistence mode.
-DSPEC_LOCAL_MEMORY_HEADROOM works as a portability flag for 116.histo,
but misplaced under optimization flag. The flag does not affect performance of the benchmark.
```

Base Runtime Environment

C benchmarks:

```
OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 9.2.106
OpenCL Device #0: Tesla V100-PCIE-16GB, v 396.26
```

C++ benchmarks:

```
OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 9.2.106
OpenCL Device #0: Tesla V100-PCIE-16GB, v 396.26
```

Base Compiler Invocation

C benchmarks:

```
pgcc
```

C++ benchmarks:

```
pgc++
```

Base Portability Flags

116.histo: `-DSPEC_LOCAL_MEMORY_HEADROOM=2(*)`
118.cutcp: `-D__GNUC__`

(*) Indicates a portability flag that was found in a non-portability variable.

Base Optimization Flags

C benchmarks:

110.fft: `-fast -Mfprelaxed -DSPEC_LOCAL_MEMORY_HEADROOM=2`

Continued on next page

Base Optimization Flags (Continued)

114.mriq: `Same as 110.fft`

116.histo: `-fast -Mfprelaxed`

117.bfs: `Same as 110.fft`

118.cutcp: `Same as 110.fft`

121.lavamd: `Same as 110.fft`

124.hotspot: `Same as 110.fft`

127.srad: `Same as 110.fft`

128.heartwall: `Same as 110.fft`

140.bplustree: `Same as 110.fft`

C++ benchmarks:
`-fast -Mfprelaxed -DSPEC_LOCAL_MEMORY_HEADROOM=2`

Base Other Flags

C benchmarks:
`-I/usr/local/cuda-9.2/targets/x86_64-linux/include/`
`-L/usr/local/cuda-9.2/targets/x86_64-linux/lib -lOpenCL`

C++ benchmarks:
`-I/usr/local/cuda-9.2/targets/x86_64-linux/include/`
`-L/usr/local/cuda-9.2/targets/x86_64-linux/lib -lOpenCL`

The flags files that were used to format this result can be browsed at
`https://www.spec.org/accel/flags/Lenovo-SPECACCEL1.2_Platform_Flags.html`
`https://www.spec.org/accel/flags/pgi2014_flags.20190321.html`

You can also download the XML flags sources by saving the following links:
`https://www.spec.org/accel/flags/Lenovo-SPECACCEL1.2_Platform_Flags.xml`
`https://www.spec.org/accel/flags/pgi2014_flags.20190321.xml`

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Tested by:	Lenovo Global Technology	**Software Availability:**	Apr-2019

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

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