# SPEC ACCEL™ OCL Result

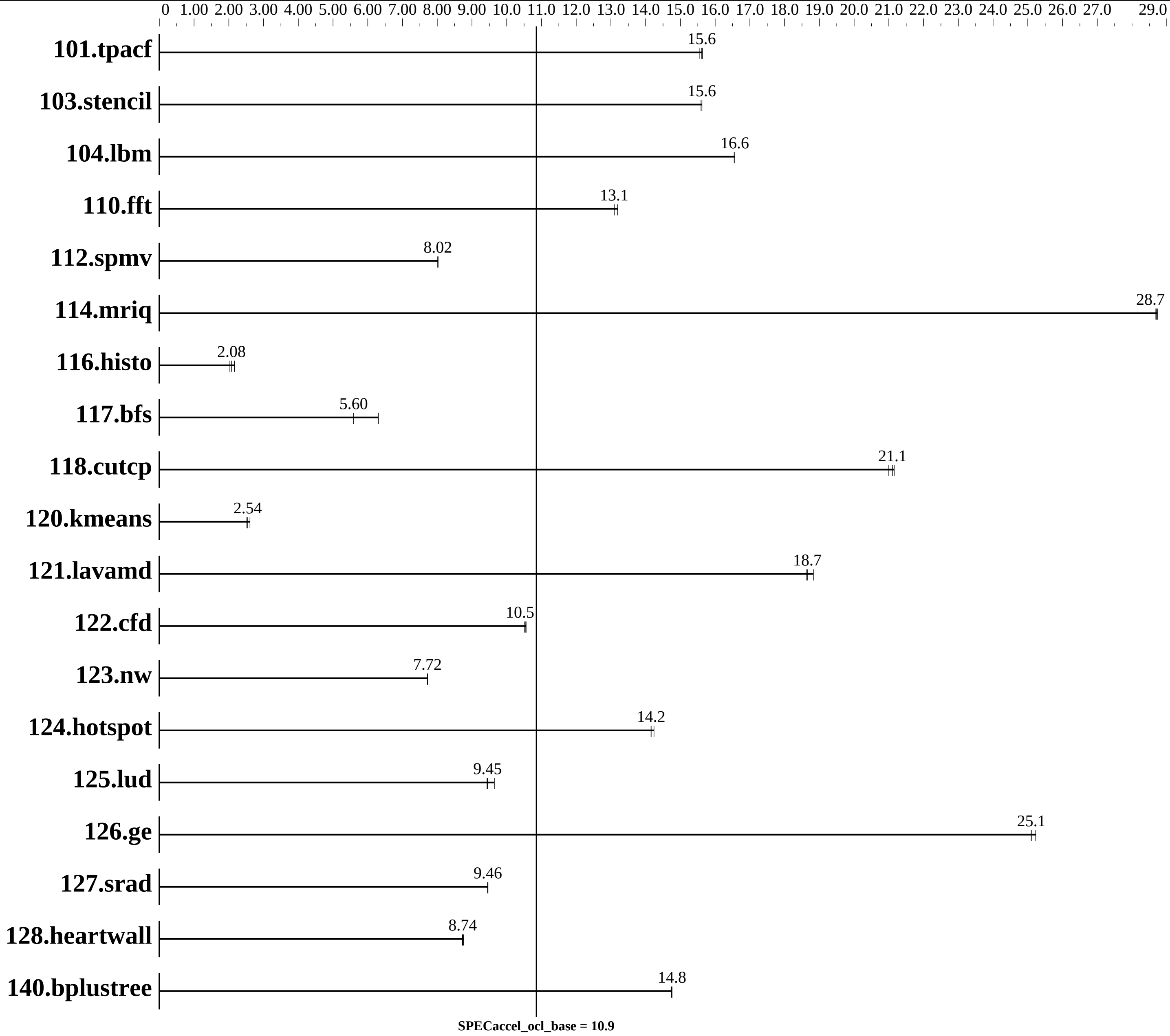


## Lenovo Global Technology
## NVIDIA Tesla V100-PCIE-16GB
## ThinkSystem SR650

SPECaccel_ocl_peak = Not Run

SPECaccel_ocl_base = 10.9

| | | | |
|---|---|---|---|
| **ACCEL license:** | 28 | **Test date:** | Mar-2019 |
| **Test sponsor:** | Lenovo Global Technology | **Hardware Availability:** | Apr-2019 |
| **Tested by:** | Lenovo Global Technology | **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

| | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Benchmark** | **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.)
```

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## 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

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

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