# SPEC® CPU2017 Floating Point Rate Result

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant ML350 Gen10

(2.50 GHz, Intel Xeon Gold 6248)

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**SPECrate2017_fp_base = 224**

**SPECrate2017_fp_peak = Not Run**

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| Copies | 0 | 30.0 | 60.0 | 90.0 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | 390 | 420 | 450 | 480 | 510 | 540 | 570 |
| 503.bwaves_r | 80 | | | | | | | | | | | | | | | | | | | |
| 507.cactuBSSN_r | 80 | | | | | | | | | | | | | | | | | | | |
| 508.namd_r | 80 | | | | | | | | | | | | | | | | | | | |
| 510.parest_r | 80 | | | | | | | | | | | | | | | | | | | |
| 511.povray_r | 80 | | | | | | | | | | | | | | | | | | | |
| 519.lbm_r | 80 | | | | | | | | | | | | | | | | | | | |
| 521.wrf_r | 80 | | | | | | | | | | | | | | | | | | | |
| 526.blender_r | 80 | | | | | | | | | | | | | | | | | | | |
| 527.cam4_r | 80 | | | | | | | | | | | | | | | | | | | |
| 538.imagick_r | 80 | | | | | | | | | | | | | | | | | | | |
| 544.nab_r | 80 | | | | | | | | | | | | | | | | | | | |
| 549.fotonik3d_r | 80 | | | | | | | | | | | | | | | | | | | |
| 554.roms_r | 80 | | | | | | | | | | | | | | | | | | | |

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**Hardware**

- **CPU Name:** Intel Xeon Gold 6248
- **Max MHz.:** 3900
- **Nominal:** 2500
- **Enabled:** 40 cores, 2 chips, 2 threads/core
- **Orderable:** 1, 2 chip(s)
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 27.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)
- **Storage:** 1 x 400 GB SAS SSD, RAID 0
- **Other:** None

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**Software**

- **OS:** SUSE Linux Enterprise Server 15 (x86_64)
- **Kernel:** 4.12.14-23-default
- **Compiler:** C/C++: Version 19.0.2.187 of Intel C/C++ Compiler Build 20190117 for Linux;
  Fortran: Version 19.0.2.187 of Intel Fortran Compiler Build 20190117 for Linux
- **Parallel:** No
- **Firmware:** HPE BIOS Version U41 02/02/2019 released Apr-2019
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen10
(2.50 GHz, Intel Xeon Gold 6248)

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

SPECrate2017_fp_base = 224
SPECrate2017_fp_peak = Not Run

Results Table

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<tr>
<th>Benchmark</th>
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</tbody>
</table>

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor.
For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
   sync; echo 3 > /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
   numactl --interleave=all runcpu <etc>

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen10
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SPECrate2017_fp_base = 224
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General Notes (Continued)

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.

Platform Notes

BIOS Configuration:
 Thermal Configuration set to Maximum Cooling
 Memory Patrol Scrubbing set to Disabled
 LLC Prefetch set to Enabled
 LLC Dead Line Allocation set to Disabled
 Enhanced Processor Performance set to Enabled
 Workload Profile set to General Throughput Compute
 Workload Profile set to Custom
 Energy/Performance Bias set to Balanced Performance

Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on ml350-sles15 Sat Apr 13 06:11:07 2019

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo

cpu cores : 20
siblings : 40
physical 0: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 80
On-line CPU(s) list: 0-79
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Hardware Availability: Apr-2019
Software Availability: Feb-2019
Test Date: Apr-2019

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6248 CPU @ 2.50GHz
Stepping: 7
CPU MHz: 2500.000
BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-9,40-49
NUMA node1 CPU(s): 10-19,50-59
NUMA node2 CPU(s): 20-29,60-69
NUMA node3 CPU(s): 30-39,70-79

Flags: 

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

/nodeinfo cache data

cache size: 28160 KB

(Continued on next page)
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Platform Notes (Continued)

0:  10  21  31  31
1:  21  10  31  31
2:  31  31  10  21
3:  31  31  21  10

From /proc/meminfo
MemTotal:       395891056 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15"
    VERSION_ID="15"
    PRETTY_NAME="SUSE Linux Enterprise Server 15"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
  Linux ml350-sles15 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown):          Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Apr 13 06:07

SPEC is set to: /home/cpu2017_u2
  Filesystem     Type    Size  Used Avail Use% Mounted on
  /dev/sdb2      btrfs    371G  205G  165G  56% /home

Additional information from dmidecode follows. 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 HPE U41 02/02/2019
  Memory:
    24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(End of data from sysinfo program)
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Tested by: HPE

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Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Compiler Version Notes

==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
CXXC 508.namd_r(base) 510.parest_r(base)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
CC  511.povray_r(base) 526.blender_r(base)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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FC  507.cactuBSSN_r(base)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.2.187 Build 20190117
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FC  503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.2.187 Build 20190117
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(Continued on next page)
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Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
# benchmarks
icc -m64 -std=c11

C++ benchmarks:
# benchmarks
icpc -m64

Fortran benchmarks:
# benchmarks
ifort -m64

Benchmarks using both Fortran and C:
# benchmarks
ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char

(Continued on next page)
Base Portability Flags (Continued)

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-03.xml
### SPEC CPU2017 Floating Point Rate Result

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| CPU2017 License: | 3 |
| Test Sponsor:   | HPE |
| Tested by:      | HPE |

- **Test Date:** Apr-2019  
- **Hardware Availability:** Apr-2019  
- **Software Availability:** Feb-2019

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

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