## SPEC CPU®2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.20 GHz, Intel Xeon Platinum 8276L)  

### SPECrate®2017_fp_base = 260

**SPECrate®2017_fp_peak = Not Run**

<table>
<thead>
<tr>
<th>Copy</th>
<th>SPECrate®2017_fp_base</th>
<th>Copies</th>
<th>SPECrate®2017_fp_peak</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>112</td>
<td>236</td>
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</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>112</td>
<td>219</td>
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<tr>
<td>508.namd_r</td>
<td>112</td>
<td>126</td>
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<tr>
<td>510.parest_r</td>
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<td>130</td>
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<td>511.povray_r</td>
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<td>521.wrf_r</td>
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<tr>
<td>526.blender_r</td>
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<td>130</td>
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<td>527.cam4_r</td>
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</tr>
<tr>
<td>538.imagick_r</td>
<td>112</td>
<td>230</td>
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<tr>
<td>544.nab_r</td>
<td>112</td>
<td>517</td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>112</td>
<td>98.3</td>
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</tr>
<tr>
<td>554.roms_r</td>
<td>112</td>
<td>727</td>
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</table>

### Hardware

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Platinum 8276L</td>
</tr>
<tr>
<td>Max MHz</td>
<td>4000</td>
</tr>
<tr>
<td>Nominal</td>
<td>2200</td>
</tr>
<tr>
<td>Enabled</td>
<td>56 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1, 2 chip(s)</td>
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<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
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<tr>
<td>L3</td>
<td>38.5 MB I+D on chip per chip</td>
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<tr>
<td>Other</td>
<td>None</td>
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<tr>
<td>Memory</td>
<td>768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)</td>
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<tr>
<td>Storage</td>
<td>1 x 960 GB SATA SSD, RAID 0</td>
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<tr>
<td>Other</td>
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### Software

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
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<td>OS</td>
<td>SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux</td>
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<tr>
<td>Parallel</td>
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<td>Firmware</td>
<td>HPE BIOS Version U30 04/18/2019 released Apr-2019</td>
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<td>File System</td>
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<td>System State</td>
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<td>Base Pointers</td>
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<td>Other</td>
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**Test Date:** Jun-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.20 GHz, Intel Xeon Platinum 8276L)

Results Table

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</tr>
</tbody>
</table>

SPECrate®2017_fp_base = 260
SPECrate®2017_fp_peak = Not Run

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/lib/ia32:/home/cpu2017/lib/intel64"
Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
NA: 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)
**SPEC CPU®2017 Floating Point Rate Result**

Hewlett Packard Enterprise  
[Test Sponsor: HPE]  
ProLiant DL380 Gen10  
(2.20 GHz, Intel Xeon Platinum 8276L)  

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<tr>
<th>SPECrate®2017_fp_base</th>
<th>260</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**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/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on dl380-clx-sles15 Mon Jun 3 12:17:03 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:
- model name : Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz  
  2 "physical id"s (chips)  
  112 "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 : 28  
  siblings : 56  
  physical 0: cores 0 1 2 3 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30  
  physical 1: cores 0 1 2 3 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 112  
- On-line CPU(s) list: 0-111  
- Thread(s) per core: 2  
- Core(s) per socket: 28  
- Socket(s): 2

(Continued on next page)
Hewlett Packard Enterprise  
ProLiant DL380 Gen10  
(2.20 GHz, Intel Xeon Platinum 8276L)  

| SPECrate®2017_fp_base = | 260 |
| SPECrate®2017_fp_peak = | Not Run |

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

| Test Date: | Jun-2019 |
| Hardware Availability: | Apr-2019 |
| Software Availability: | Nov-2018 |

Platform Notes (Continued)

NUMA node(s): 4  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz  
Stepping: 7  
CPU MHz: 2200.000  
BogoMIPS: 4400.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 39424K  
NUMA node0 CPU(s): 0-13, 56-69  
NUMA node1 CPU(s): 14-27, 70-83  
NUMA node2 CPU(s): 28-41, 84-97  
NUMA node3 CPU(s): 42-55, 98-111  
Flags: fpu vme de pse sse sse2 msr pub mca cmov pat pse36 clflush dts acpi mmx fxsr sse syscall nx pdcplgb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmerf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pinn mba tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bm1l hel avx2 smep bmi2 erms invpctd rtm cmx mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaveopt xsaves cqm_llc cqm_occup LLC cqm_mmb_total cqm_mmb_local ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

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

(cache size : 39424 KB)

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.20 GHz, Intel Xeon Platinum 8276L)

SPECrate®2017_fp_base = 260
SPECrate®2017_fp_peak = Not Run

Platform Notes (Continued)

106 107 108 109 110 111
node 3 size: 193333 MB
node 3 free: 193132 MB
node distances:
node  0   1   2   3
 0:  10  21  31  31
 1:  21   0  31  31
 2:  31  31  10  21
 3:  31  31  21   0

From /proc/meminfo
MemTotal:       791971352 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 dl380-clx-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 Jun 3 12:15

SPEC is set to: /home/cpu2017
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda3 btrfs 407G 101G 307G 25% /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.

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.20 GHz, Intel Xeon Platinum 8276L)

SPECrater®2017_fp_base = 260
SPECrater®2017_fp_peak = Not Run

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

Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

Platform Notes (Continued)

BIOS HPE U30 04/18/2019
Memory:
24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

C
------------------ 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

C++
------------------ 508.namd_r(base) 510.parest_r(base)
-------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

C++, C
------------------ 511.povray_r(base) 526.blender_r(base)
-------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

C++, C, Fortran
------------------ 507.cactuBSSN_r(base)
-------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018

(Continued on next page)
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Copyright 2017-2019 Standard Performance Evaluation Corporation

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ProLiant DL380 Gen10
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SPECrater®2017_fp_base = 260
SPECrater®2017_fp_peak = Not Run

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

Test Date:  Jun-2019
Hardware Availability:  Apr-2019
Software Availability:  Nov-2018

Compiler Version Notes (Continued)
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
Fortran   |  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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------
Fortran, C |  521.wrf_r(base)  527.cam4_r(base)
-----------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
  icc -m64 -std=c11

C++ benchmarks:
  icpc -m64

Fortran benchmarks:
  ifort -m64

Benchmarks using both Fortran and C:
  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
**SPEC CPU®2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.20 GHz, Intel Xeon Platinum 8276L)

<table>
<thead>
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<th>3</th>
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<tr>
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<td>HPE</td>
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<td>Tested by:</td>
<td>HPE</td>
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**SPECrate®2017_fp_base = 260**
**SPECrate®2017_fp_peak = Not Run**

**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
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
**SPEC CPU®2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.20 GHz, Intel Xeon Platinum 8276L)  

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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-revB.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-revB.xml

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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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