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

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>256</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Platinum 8276  
- **Max MHZ.:** 4000  
- **Nominal:** 2200  
- **Enabled:** 56 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:** 38.5 MB I+D on chip per chip  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 1 x 480 GB SATA SSD, RAID 0  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15 (x86_64)  
- **Kernel:** 4.12.14-23-default  
- **Compiler:** 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  
- **Parallel:** No  
- **Firmware:** HPE BIOS Version U30 02/02/2019 released Apr-2019  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None

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<table>
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<tr>
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<th>Apr-2019</th>
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<tbody>
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### Copies

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### CPU2017 License

- **Test Sponsor:** HPE  
- **Tested by:** HPE

### Test Sponsor: HPE

- **Tested by:** HPE  
- **Software Availability:** Nov-2018  
- **Hardware Availability:** Apr-2019

### Copyright

Copyright 2017-2019 Standard Performance Evaluation Corporation

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### Table

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### SPEC CPU2017 Floating Point Rate Result

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

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<td><strong>1945</strong></td>
<td><strong>91.5</strong></td>
</tr>
</tbody>
</table>

**SPECrate2017_fp_base = 256**
**SPECrate2017_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 CPU2017 Floating Point Rate Result
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SPECrate2017_fp_base = 256
SPECrate2017_fp_peak = Not Run

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

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</table>

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/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on dl380-clx-sles15hs Tue Apr 16 19:25:13 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

```plaintext
model name : Intel(R) Xeon(R) Platinum 8276 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  
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---

### Platform Notes (Continued)

- **NUMA node(s):** 4
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Platinum 8276 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 tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperffmperf 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 bmi1 hle avx2 smep bmi2 ibrms invpcid rtl cmx mpx rd_t a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsavesopt xsaveopt xsaes cqm_llc cqm_occup_llc cqm_mmb_total cqm_mmb_local ibpb ibrs stibp dtherm ida arat pln pts pkup ospke avx512_vnni arch_capabilities ssebd
```

From `numactl --hardware`

```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
```

```
node 0 cpus: 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 70 71 72 73 74 75 76 77 78 79 80 81 82 83
node 0 size: 96277 MB
node 0 free: 95785 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 70 71 72 73 74 75 76 77 78 79 80
node 1 size: 96762 MB
node 1 free: 96533 MB
node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 84 85 86 87 88 89 90 91 92 93 94
node 2 size: 96762 MB
node 2 free: 96598 MB
node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 98 99 100 101 102 103 104 105 106
node 3 size: 96762 MB
node 3 free: 96598 MB
```
## Platform Notes (Continued)

106 107 108 109 110 111
node 3 size: 96535 MB
node 3 free: 96380 MB
node distances:
node 0 1 2 3
  0: 10 21 31 31
  1: 21 10 31 31
  2: 31 31 10 21
  3: 31 31 21 10

From /proc/meminfo
MemTotal: 395609668 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
```
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"
```
uelve -a:
```
Linux dl380-clx-sles15hs 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 16 19:22

SPEC is set to: /home/cpu2017
```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs  476G  68G  409G  15% /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  
ProLiant DL380 Gen10  
(2.20 GHz, Intel Xeon Platinum 8276)

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

SPECrate2017_fp_base = 256  
SPECrate2017_fp_peak = Not Run

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

Platform Notes (Continued)

BIOS HPE U30 02/02/2019  
Memory:  
24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)

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

==============================================================================
FC  507.cactuBSSN_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.
**Compiler Version Notes (Continued)**

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

```
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 19.0.1.144 Build 20181018

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

```
CC 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.

---

**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 ifort -m64
```
SPEC CPU2017 Floating Point Rate Result

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

### Base Portability Flags

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<td>519.ibm_r</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>521.wrf_r</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
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<td>526.blender_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX -funsigned-char</td>
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<td>527.cam4_r</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG</td>
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<td>538.imagick_r</td>
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### 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
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.20 GHz, Intel Xeon Platinum 8276)

SPECrate2017_fp_peak = Not Run
SPECrate2017_fp_base = 256

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

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