Hewlett Packard Enterprise  
ProLiant DL380 Gen10  
(2.70 GHz, Intel Xeon Platinum 8280)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>156</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
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</table>

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base (156)</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>56</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>56</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>56</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>56</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>56</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>56</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>56</td>
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<tr>
<td>644.nab_s</td>
<td>56</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>56</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>56</td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** Intel Xeon Platinum 8280  
- **Max MHz.:** 4000  
- **Nominal:** 2700  
- **Enabled:** 56 cores, 2 chips  
- **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  
- **Other:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)  
- **Storage:** 1 x 960 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 19.0.2.187 of Intel C/C++ Compiler Build 20190131 for Linux; Fortran: Version 19.0.2.187 of Intel Fortran Compiler Build 20190131 for Linux  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version U30 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
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>48.7</td>
<td>108</td>
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<td>66.3</td>
<td>134</td>
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<tr>
<td>628.pop2_s</td>
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<td>56.9</td>
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<td>58.3</td>
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<td>85.0</td>
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<tr>
<td>644.nab_s</td>
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<td>327</td>
<td>327</td>
<td>53.4</td>
<td>327</td>
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<td>649.fotonik3d_s</td>
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<td>106</td>
<td>86.6</td>
<td>85.8</td>
<td>105</td>
<td>87.2</td>
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<td>654.roms_s</td>
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<td>98.3</td>
<td>162</td>
<td>160</td>
<td>99.7</td>
<td>158</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 156
SPECspeed2017_fp_peak = Not Run

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

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

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=core,compact"
LD_LIBRARY_PATH= "/home/cpu2017_ic19/lib/ia32:/home/cpu2017_ic19/lib/intel64:
/home/cpu2017_ic19/je5.0.1-32:/home/cpu2017_ic19/je5.0.1-64"
OMP_STACKSIZE = "192M"
Binaries compiled on a system with 1x Intel Core i9-799X 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.
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:
Hyper-Threading set to Disabled
Thermal Configuration set to Maximum Cooling

(Continued on next page)
Platform Notes (Continued)

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 Peak Frequency Compute
Energy/Performance Bias set to Balanced Power
Workload Profile set to Custom
Numa Group Size Optimization set to Flat
Intel UPI Link Power Management set to Enabled
Sysinfo program /home/cpu2017_ic19/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-9mbf Wed Feb 27 16:11:26 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 8280 CPU @ 2.70GHz
  2 "physical id"s (chips)
  56 "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 : 28
physical 0: cores 0 1 2 3 4 5 6 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 4 5 6 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): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2700.000
BogoMIPS: 5400.00
**SPEC CPU2017 Floating Point Speed Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL380 Gen10
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<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### Platform Notes (Continued)

- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 39424K
- **NUMA node0 CPU(s):** 0-27
- **NUMA node1 CPU(s):** 28-55
- **Flags:** fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrn pdcm 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 cdq_l3 invpcid_single intel_pni mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsave cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ia arat pin pts pku ospke avx512_vnni arch_capabilities ssbd

From `numactl --hardware` data

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

<table>
<thead>
<tr>
<th>Available nodes</th>
<th>(0-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node 0 cpus</td>
<td>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</td>
</tr>
<tr>
<td>Node 0 size</td>
<td>193016 MB</td>
</tr>
<tr>
<td>Node 0 free</td>
<td>192341 MB</td>
</tr>
<tr>
<td>Node 1 cpus</td>
<td>28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55</td>
</tr>
<tr>
<td>Node 1 size</td>
<td>193332 MB</td>
</tr>
<tr>
<td>Node 1 free</td>
<td>193153 MB</td>
</tr>
<tr>
<td>Node distances</td>
<td>node 0 1</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

```
MemTotal: 395621016 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

From `/etc/*release*` and `/etc/*version*`

```
os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
```

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
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SPECspeed2017_fp_base = 156
SPECspeed2017_fp_peak = Not Run

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

Platform Notes (Continued)

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 linux-9mbf 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 Feb 27 16:09

SPEC is set to: /home/cpu2017_ic19
    Filesystem Type  Size  Used Avail Use% Mounted on
    /dev/sdb4 xfs 436G 169G 268G 39% /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 U30 02/02/2019
Memory:
    24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

FC  607.cactuBSSN_s(base)
------------------------------------------------------------------------------

(Continued on next page)
Compiler Version Notes (Continued)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.0.117 Build 20180804
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64
SPEC CPU2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.70 GHz, Intel Xeon Platinum 8280)

SPECspeed2017_fp_base = 156
SPECspeed2017_fp_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE
Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
-nostandard-realloc-lhs -align array32byte

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
-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
http://www.spec.org/cpu2017/flags/HPE-lc19.0u1-flags-linux64.2019-04-03.html
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<th>Mar-2019</th>
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<tr>
<td>Software Availability:</td>
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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/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.

Tested with SPEC CPU2017 v1.0.5 on 2019-02-27 16:11:25-0500.
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