### SPEC® CPU2017 Floating Point Speed Result

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL580 Gen10  
(2.70 GHz, Intel Xeon Platinum 8280)

**SPECspeed2017_fp_base = 215**  
**SPECspeed2017_fp_peak = Not Run**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base (215)</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>84.0</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>234.0</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>164.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>147.0</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>177.0</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>53.1</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>283.0</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>513.0</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>113.0</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>315.0</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Platinum 8280  
- **Max MHz.:** 4000  
- **Nominal:** 2700  
- **Enabled:** 112 cores, 4 chips  
- **Orderable:** 1, 2, 3, 4 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:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 600 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:** Yes  
- **Firmware:**  
  HPE BIOS Version U34 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
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<th>Test Date: Feb-2019</th>
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<td>Hardware Availability: Apr-2019</td>
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SPECspeed2017_fp_base = 215  
SPECspeed2017_fp_peak = Not Run

### 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>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>112</td>
<td>75.5</td>
<td>781</td>
<td>73.6</td>
<td>801</td>
<td><strong>75.2</strong></td>
<td><strong>784</strong></td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>112</td>
<td><strong>71.2</strong></td>
<td><strong>234</strong></td>
<td>70.9</td>
<td>235</td>
<td>71.6</td>
<td>233</td>
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<tr>
<td>619.lbm_s</td>
<td>112</td>
<td>32.1</td>
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<td><strong>31.9</strong></td>
<td><strong>164</strong></td>
<td>31.8</td>
<td>165</td>
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<tr>
<td>621.wrf_s</td>
<td>112</td>
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<td>90.1</td>
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<td><strong>89.8</strong></td>
<td><strong>147</strong></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>112</td>
<td>50.3</td>
<td>176</td>
<td><strong>50.0</strong></td>
<td><strong>177</strong></td>
<td>49.9</td>
<td>178</td>
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<tr>
<td>628.pop2_s</td>
<td>112</td>
<td>227</td>
<td>52.4</td>
<td><strong>224</strong></td>
<td><strong>53.1</strong></td>
<td>219</td>
<td>54.2</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>112</td>
<td>51.2</td>
<td>282</td>
<td><strong>51.1</strong></td>
<td><strong>282</strong></td>
<td>50.6</td>
<td>285</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>112</td>
<td>34.0</td>
<td>514</td>
<td><strong>34.1</strong></td>
<td><strong>513</strong></td>
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<td>112</td>
<td>77.5</td>
<td>118</td>
<td><strong>80.9</strong></td>
<td><strong>113</strong></td>
<td>83.6</td>
<td>109</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>112</td>
<td>48.0</td>
<td>328</td>
<td>50.6</td>
<td>311</td>
<td><strong>50.0</strong></td>
<td><strong>315</strong></td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 215  
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/lib/ia32:/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

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.
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)
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Software Availability: Nov-2018

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
Advanced Memory Protection set to Advanced ECC

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
running on linux-lj2l Fri Mar 1 13:51:54 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
4 "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 : 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
physical 2: 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 3: 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): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6

(Continued on next page)
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<th><strong>SPECspeed2017_fp_base</strong></th>
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<tbody>
<tr>
<td>Not Run</td>
<td>215</td>
</tr>
</tbody>
</table>

**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

**Test Date:** Feb-2019

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**Platform Notes (Continued)**

- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz  
- **Stepping:** 7

**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  
**NUMA node2 CPU(s):** 56-83  
**NUMA node3 CPU(s):** 84-111

**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 p3p ml xsave cmovpat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx p3p ml xsave pse36

```plaintext
From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
  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
  node 0 size: 193086 MB
  node 0 free: 192546 MB
  node 1 cpus: 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
  node 1 size: 193086 MB
  node 1 free: 192546 MB
  node 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
  node 2 size: 193086 MB
  node 2 free: 192546 MB
  node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111
  node 3 size: 193086 MB
  node 3 free: 192546 MB
```

```plaintext
/proc/cpuinfo cache data
  cache size : 39424 KB
```

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Platform Notes (Continued)

node distances:
node  0  1  2  3
0:  10  21  21  21
1:  21  10  21  21
2:  21  21  10  21
3:  21  21  21  10

From /proc/meminfo
MemTotal:       792245484 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 linux-lj2l 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 Mar 1 10:54

SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sdb3      xfs   141G  119G   23G  84% /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 U34 02/02/2019
Memory:
  24x UNKNOWN NOT AVAILABLE

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**Platform Notes (Continued)**

24x UNKNOWN NOT AVAILABLE 32 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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
FC 607.cactuBSSN_s(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 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(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 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.1.144 Build 20181018  
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```

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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

---

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=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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.

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