## SPEC® CPU2017 Floating Point Speed Result

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

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: SUSE Linux Enterprise Server 15 (x86_64)</td>
<td>CPU Name: Intel Xeon Platinum 8280</td>
</tr>
<tr>
<td>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</td>
<td>Max MHz.: 4000</td>
</tr>
<tr>
<td>File System: btrfs</td>
<td>Nominal: 2700</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Enabled: 28 cores, 1 chip</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>Orderable: 1,2 chip(s)</td>
</tr>
<tr>
<td>Peak Pointers: Not Applicable</td>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Other: None</td>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>Storage: 1 x 960 GB SATA SSD, RAID 0</td>
<td>Other: None</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base** = 103

**SPECspeed2017_fp_peak** = Not Run

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<thead>
<tr>
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<tbody>
<tr>
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<tr>
<td>Tested by: HPE</td>
</tr>
<tr>
<td>Software Availability: Feb-2019</td>
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### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Value</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>28</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>28</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>28</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>28</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>28</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>28</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>28</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>28</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>28</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>28</td>
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<td><strong>Peak Pointers:</strong> Not Applicable</td>
</tr>
<tr>
<td><strong>L2:</strong> 1 MB I+D on chip per core</td>
<td><strong>Other:</strong> None</td>
</tr>
<tr>
<td><strong>L3:</strong> 38.5 MB I+D on chip per chip</td>
<td><strong>Other:</strong> None</td>
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<tr>
<td><strong>Other:</strong> None</td>
<td><strong>Memory:</strong> 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td><strong>Storage:</strong> 1 x 960 GB SATA SSD, RAID 0</td>
<td><strong>Other:</strong> None</td>
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</tbody>
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## Results Table

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

**SPECspeed2017_fp_base** = 103
**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_fpSpeed/lib/ia32:/home/cpu2017_fpSpeed/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-Threaded set to Disabled
Thermal Configuration set to Maximum Cooling
Memory Patrol Scrubbing set to Disabled

(Continued on next page)
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ProLiant DL380 Gen10
(2.70 GHz, Intel Xeon Platinum 8280)

SPECspeed2017_fp_base = 103
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

Platform Notes (Continued)

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 Mar 13 11:25:01 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
  1 "physical id"s (chips)
  28 "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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 28
On-line CPU(s) list: 0-27
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 1
NUMA node(s): 1
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
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K

(Continued on next page)
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SPECspeed2017_fp_base = 103
SPECspeed2017_fp_peak = Not Run

Platform Notes (Continued)

L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27
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 nop1 xtopology nonstop_tsc cpuid
aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtpmr dpmi 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 cd8 L3 invpcid_single intel_pmp mba tpr_shadow vnumi flexpriority ept
vpid fsgleaqbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cqm mpx rt a
avx512f avx512dq rdseed adx smap cfllushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsaves xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
ibpb ibrs stibp dtherm ida arat plm pts pkp ospke avx512_vnni arch_capabilities ssbd

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 1 nodes (0)
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: 192818 MB
node 0 free: 189578 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 197446212 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-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

(Continued on next page)
Platform Notes (Continued)

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 13 10:30:

SPEC is set to: /home/cpu2017_ic19
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb4 xfs 436G 217G 220G 50% /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:
12x UNKNOWN NOT AVAILABLE
12x 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)
------------------------------------------------------------------------------
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

(Continued on next page)
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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

Compiler Version Notes (Continued)

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)
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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

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

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<td>Hardware Availability: Apr-2019</td>
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<td>Software Availability: Feb-2019</td>
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<tr>
<td>HPE</td>
<td></td>
</tr>
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</table>

#### Base Portability Flags (Continued)

- 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-Platform-Flags-Intel-V1.2-CLX-revA.html)
- [http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.2019-04-03.00.html](http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.2019-04-03.00.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/HPE-Platform-Flags-Intel-V1.2-CLX-revA.xml)
- [http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.2019-04-03.00.xml](http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.2019-04-03.00.xml)
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SPECspeed2017_fp_base = 103  
SPECspeed2017_fp_peak = Not Run  

Test Date: Mar-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.

Tested with SPEC CPU2017 v1.0.5 on 2019-03-13 11:25:01-0400.  
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