## SPEC® CPU2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML350 Gen10  
(3.80 GHz, Intel Xeon Platinum 8256)

**SPECspeed2017_fp_base** = 59.8  
**SPECspeed2017_fp_peak** = Not Run

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Platinum 8256</td>
<td>OS: SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td>Max MHz.: 3900</td>
<td>Kernel 4.12.14-23-default</td>
</tr>
<tr>
<td>Nominal: 3800</td>
<td>Compiler: C/C++: Version 19.0.2.187 of Intel C/C++</td>
</tr>
<tr>
<td>Enabled: 8 cores, 2 chips</td>
<td>Compiler Build 20190117 for Linux;</td>
</tr>
<tr>
<td>Orderable: 1, 2 chip(s)</td>
<td>Fortran: Version 19.0.2.187 of Intel Fortran</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Compiler Build 20190117 for Linux</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Parallel: Yes</td>
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<tr>
<td>L3: 16.5 MB I+D on chip per chip</td>
<td>Firmware: HPE BIOS Version U41 02/02/2019 released Apr-2019</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Storage: 1 x 400 GB SAS SSD, RAID 0</td>
<td>Peak Pointers: Not Applicable</td>
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<tr>
<td>Other: None</td>
<td>Other: None</td>
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### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base (59.8)</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>8</td>
<td>55.1</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>8</td>
<td>46.7</td>
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<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>60.9</td>
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<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>33.5</td>
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<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>46.8</td>
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<tr>
<td>628.pop2_s</td>
<td>8</td>
<td>36.5</td>
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<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>64.5</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>8</td>
<td>59.7</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>8</td>
<td>56.2</td>
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</table>

**Threads**: 8  
**Test Sponsor**: HPE  
**Test Date**: Apr-2019  
**Hardware Availability**: Apr-2019  
**Tested by**: HPE  
**Software Availability**: Feb-2019
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Results Table

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<td>280</td>
<td>56.2</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 59.8
SPECspeed2017_fp_peak = Not Run

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=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/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
NA: 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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Test Sponsor: HPE
Tested by: HPE

SPECspeed2017_fp_base = 59.8
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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
Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on ml350-sles15 Thu Apr 18 03:53:44 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 8256 CPU @ 3.80GHz
  2 "physical id"s (chips)
  8 "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 : 4
siblings : 4
physical 0: cores 5 8 9 13
physical 1: cores 2 5 9 13

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8256 CPU @ 3.80GHz
Stepping: 6
CPU MHz: 3800.000
BogoMIPS: 7600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K

(Continued on next page)
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SPECspeed2017_fp_base = 59.8
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L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(0): 0-3
NUMA node1 CPU(4-7)

Flags: fpu vme de pse tsc msr pae mca 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
 aperf perfctr tsc_known_freq pni pclmulqdq dtes64monitor 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_i3 cdp_l3 invpcid_single intel_pwpin mba tpr_shadow vmi flexpriority ept
 vpid fsbegbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdt_a
 avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512ld avx512bw avx512vl
 xsaveopt xsaves xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
 ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

/platforminfo cache data
  cache size : 16896 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3
  node 0 size: 193121 MB
  node 0 free: 192801 MB
  node 1 cpus: 4 5 6 7
  node 1 size: 193505 MB
  node 1 free: 193195 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395906492 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"

(Continued on next page)
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**SPECspeed2017_fp_base** = 59.8

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---

### Platform Notes (Continued)

```plaintext
cpe_NAME="cpe:/o:suse:sles:15"

uname -a:
Linux ml350-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 Apr 18 03:49

SPEC is set to: /home/cpu2017_u2
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sdb2 btrfs 371G 209G 161G 57% /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 U41 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 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 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 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

(Continued on next page)
### Hewlett Packard Enterprise

**Test Sponsor:** HPE  
**ProLiant ML350 Gen10**  
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<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>59.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
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</table>

#### Compiler Version Notes (Continued)

Version 19.0.2.187 Build 20190117  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R)  
64, Version 19.0.2.187 Build 20190117  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)

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Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R)  
64, Version 19.0.2.187 Build 20190117  
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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 19.0.2.187 Build 20190117  
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---------------------------

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
```

(Continued on next page)
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Base Portability Flags (Continued)

607.cactuBSN_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
-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=4 -qopenmp
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
-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
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
-nostandard-realloc-lhs

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
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
-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
http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.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-ic19.0u1-flags-linux64.xml
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<th><strong>CPU2017 License</strong></th>
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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 2019-04-17 18:23:43-0400.  