## SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(3.40 GHz, Intel Xeon Gold 6246R)

**SPECspeed®2017_fp_base = 137**  
**SPECspeed®2017_fp_peak = 138**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (137)</th>
<th>SPECspeed®2017_fp_peak (138)</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<td>607.cactuBSSN_s</td>
<td>32</td>
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<tr>
<td>619.lbm_s</td>
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<td>621.wrf_s</td>
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<td>628.pop2_s</td>
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<td>638.imagick_s</td>
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<td>649.fotonik3d_s</td>
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<tr>
<td>654.roms_s</td>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6246R  
- **Max MHz:** 4100  
- **Nominal:** 3400  
- **Enabled:** 32 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:** 35.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 400 GB SAS SSD  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
- **Kernel:** 4.12.14-195-default  
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++  
- **Compiler Build:** 20190416 for Linux; Fortran: Version 19.0.4.227 of Intel Fortran  
- **Compiler Build:** 20190416 for Linux  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version U30 2.22 (11/13/2019) released Feb-2020  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
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ProLiant DL380 Gen10
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

SPECspeed®2017_fp_base = 137
SPECspeed®2017_fp_peak = 138

Test Date: Feb-2020
Hardware Availability: Feb-2020
Software Availability: Jun-2019

Results Table

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<tr>
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</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 137
SPECspeed®2017_fp_peak = 138

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

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=core,compact"
LD_LIBRARY_PATH = ":/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes

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
- 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
- Numa Group Size Optimization set to Flat
- Energy/Performance Bias set to Balanced Power

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on linux-3rlx Tue Feb 4 23:57:34 2020

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) Gold 6246R CPU @ 3.40GHz`  
  - 2 "physical id"s (chips)  
  - 32 "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 : 16`
  - `siblings : 16`
  - `physical 0: cores 0 1 2 3 5 6 9 11 12 16 18 19 20 26 28 29`
  - `physical 1: cores 1 2 3 6 9 12 13 16 17 18 19 22 26 27 28 29`

From lscpu:
- `Architecture: x86_64`
- `CPU op-mode(s): 32-bit, 64-bit`
- `Byte Order: Little Endian`
- `Address sizes: 46 bits physical, 48 bits virtual`
- `CPU(s): 32`
- `On-line CPU(s) list: 0-31`
- `Thread(s) per core: 1`
- `Core(s) per socket: 16`
- `Socket(s): 2`
- `NUMA node(s): 2`
- `Vendor ID: GenuineIntel`
- `CPU family: 6`
- `Model: 85`
- `Model name: Intel(R) Xeon(R) Gold 6246R CPU @ 3.40GHz`
- `Stepping: 7`
- `CPU MHz: 3400.000`

(Continued on next page)
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Test Sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

BogoMIPS: 6800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-15
NUMA node1 CPU(s): 16-31
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 pdpelgb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg 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_13 cd8_13
invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmni
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld
arch_capabilities

/proc/cpuinfo cache data
   cache size : 36608 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 4 5 6 7 8 9 10 11 12 13 14 15
   node 0 size: 193127 MB
   node 0 free: 190873 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
   node 1 size: 193502 MB
   node 1 free: 193062 MB
   node distances:
      node 0 1
      0: 10 21
      1: 21 10

From /proc/meminfo
   MemTotal: 395909228 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP1"

(Continued on next page)
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Test Date: Feb-2020
Hardware Availability: Feb-2020
Software Availability: Jun-2019

Platform Notes (Continued)

VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
    Linux linux-3rlx 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Feb 4 23:55

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda2 btrfs 369G 55G 314G 15% /home

From /sys/devices/virtual/dmi/id
    BIOS: HPE U30 11/13/2019
    Vendor: HPE
    Product: ProLiant DL380 Gen10
    Product Family: ProLiant
    Serial: 2M294204YV

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.

Memory:
    12x UNKNOWN NOT AVAILABLE
    12x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(End of data from sysinfo program)
### Compiler Version Notes

<table>
<thead>
<tr>
<th>Language</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>644.nab_s(base, peak)</td>
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<tr>
<td>C</td>
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<td>Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416</td>
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<td>Copyright (C) 1985-2019 Intel Corporation. All rights reserved.</td>
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<td>C++, C, Fortran</td>
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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 -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

(Continued on next page)
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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

Peak 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

Peak Portability Flags

Same as Base Portability Flags

Peak 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:
603.bwaves_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
649.fotonik3d_s: Same as 603.bwaves_s
654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4

(Continued on next page)
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| SPECspeed\textsuperscript{®}2017\_fp\_peak | 138 |

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Tested by: HPE

Peak Optimization Flags (Continued)

654.roms\_s (continued):
\texttt{-qopenmp -nostandard-realloc-lhs}

Benchmarks using both Fortran and C:

621.wrf\_s: \texttt{-prof-gen(pass 1) -prof-use(pass 2) -02 -xCORE-AVX512}
\texttt{-qopt-prefetch -ipo -03 -ffinite-math-only -no-prec-div}
\texttt{-qopt-mem-layout-trans=4 -DSPEC\_SUPPRESS\_OPENMP -qopenmp}
\texttt{-DSPEC\_OPENMP -nostandard-realloc-lhs}

627.cam4\_s: \texttt{-xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch}
\texttt{-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp}
\texttt{-DSPEC\_OPENMP -nostandard-realloc-lhs}

628.pop2\_s: Same as 621.wrf\_s

Benchmarks using Fortran, C, and C++:

\texttt{-xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch}
\texttt{-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP}
\texttt{-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-revB.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-revB.xml

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