## SPEC CPU®2017 Floating Point Rate Result

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(3.00 GHz, Intel Xeon Gold 5317)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>HPE</th>
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<tbody>
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<td>Tested by</td>
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<td>Hardware Avail</td>
<td>Jun-2021</td>
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<td>Software Avail</td>
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### Test Results

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<th>SPECrate®2017_fp_base</th>
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<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>237</td>
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### Hardware

- **CPU Name**: Intel Xeon Gold 5317
- **Max MHz**: 3600
- **Nominal**: 3000
- **Enabled**: 24 cores, 2 chips, 2 threads/core
- **Orderable**: 1, 2 chip(s)
- **Cache L1**: 32 KB I + 48 KB D on chip per core
- **L2**: 1.25 MB I+D on chip per core
- **L3**: 18 MB I+D on chip per chip
- **Other**: None
- **Memory**: 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)
- **Storage**: 1 x 800 GB SAS SSD, RAID 0
- **Other**: None

### Software

- **OS**: Red Hat Enterprise Linux 8.3 (Ootpa)
- **Kernel**: 4.18.0-240.el8.x86_64
- **Compiler**: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
  Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
  C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
- **Parallel**: No
- **Firmware**: HPE BIOS Version U46 v1.42 05/16/2021 released May-2021
- **File System**: xfs
- **System State**: Run level 3 (multi-user)
- **Base Pointers**: 64-bit
- **Peak Pointers**: 64-bit
- **Other**: jemalloc memory allocator V5.0.1

(Continued on next page)
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**Tested by:** HPE

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**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

**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:  
`LD_LIBRARY_PATH = 
"/home/cpu2017_1.1.8/lib/intel64:/home/cpu2017_1.1.8/je5.0.1-64"
MALLOC_CONF = "retain: true"`
SPEC CPU®2017 Floating Point Rate Result

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SPECrate®2017_fp_base = 231
SPECrate®2017_fp_peak = 237

Test Date: Aug-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1
runcpu command invoked through numactl i.e.:
umactl --interleave=all runcpu <etc>
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.
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Mon Aug 16 13:17:56 EDT 2021
Submission: cpu2017-20210816-28736.sub

Platform Notes

BIOS Configuration:
Workload Profile set to General Throughput Compute
Memory Patrol Scrubbing set to Disabled
Advanced Memory Protection set to Advanced ECC
Last Level Cache (LLC) Prefetch set to Enabled
Enhanced Processor Performance set to Enabled
Enhanced Processor Performance Profile set to Aggressive
Thermal Configuration set to Maximum Cooling
Workload Profile set to Custom
DCU Stream Prefetcher set to Disabled
XPT Remote Prefetcher set to Enabled
Energy/Performance Bias set to Balanced Performance

Sysinfo program /home/cpu2017_1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaefc64d
running on localhost.localdomain Fri Jun 22 16:47:10 2018

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 5317 CPU @ 3.00GHz
  2 "physical id"s (chips)
  48 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following

(Continued on next page)
Platform Notes (Continued)

excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

cpu cores : 12
siblings : 24
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11

From lscpu from util-linux 2.32.1:
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              48
On-line CPU(s) list: 0-47
Thread(s) per core:  2
Core(s) per socket:  12
Socket(s):           2
NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               106
Model name:          Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
Stepping:            6
CPU MHz:             1046.190
BogoMIPS:            6000.00
Virtualization:      VT-x
L1d cache:           48K
L1l cache:           32K
L2 cache:            1280K
L3 cache:            18432K
NUMA node0 CPU(s):   0-5,24-29
NUMA node1 CPU(s):   6-11,30-35
NUMA node2 CPU(s):   12-17,36-41
NUMA node3 CPU(s):   18-23,42-47
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 pni pclmulqdq dtes64 monitor ds cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrunc 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 invpcid_single ssbd
mba ibpb stibp ibrs enhanced tpr_shadow vnmi flexpriority ept pvd ept_ad
fsbase這 tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw
avx512vl xsaveopt xsavec xgetbv1 xsavev cqm_llc cqm_occum_llc cqm_mbm_total
cqm_mbb_local split_lock_detect wboinvd dtherm idar arat pin pts avx512vmbm umip pku
ospke avx512_vbmi2 gfnia vaes vpcmldqavx avx512_vnni avx512_bitalg tme
avx512_vpopcntdq la57 rdpid md_clear pconfi flush_lld arch_capabilities

/proc/cpuinfo cache data

(Continued on next page)
Platform Notes (Continued)

```
cache size : 18432 KB

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 24 25 26 27 28 29
node 0 size: 509910 MB
node 0 free: 515395 MB
node 1 cpus: 6 7 8 9 10 11 30 31 32 33 34 35
node 1 size: 509948 MB
node 1 free: 515562 MB
node 2 cpus: 12 13 14 15 16 17 36 37 38 39 40 41
node 2 size: 510304 MB
node 2 free: 515599 MB
node 3 cpus: 18 19 20 21 22 23 42 43 44 45 46 47
node 3 size: 509816 MB
node 3 free: 515772 MB
node distances:
   node 0 1 2 3
0:  10  20  30  30
1:  20  10  30  30
2:  30  30  10  20
3:  30  30  20  10

From /proc/meminfo
MemTotal:       2113491132 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
/sbin/tuned-adm active
   Current active profile: throughput-performance

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux"
      VERSION="8.3 (Ootpa)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="8.3"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
      ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
```

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| Test Sponsor:   | HPE |
| Tested by:      | HPE |

**Platform Notes (Continued)**

Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020  
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

- **CVE-2018-12207 (iTLB Multihit):** Not affected
- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **CVE-2017-5754 (Meltdown):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: usercopy/swapsq barriers and __user pointer sanitization
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: usercopy/swapsq barriers and __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** Not affected
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

run-level 3 Jun 22 16:41

SPEC is set to: /home/cpu2017_1.1.8  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/mapper/rhel-home xfs 670G 124G 547G 19% /home

From /sys/devices/virtual/dmi/id  
Vendor: HPE  
Product: ProLiant DL380 Gen10 Plus  
Product Family: ProLiant  
Serial: CN70490X8B

Additional information from dmidecode 3.2 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:  
32x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2933

BIOS:  
BIOS Vendor: HPE  
BIOS Version: U46  
BIOS Date: 05/16/2021  
BIOS Revision: 1.42  
Firmware Revision: 2.50

(End of data from sysinfo program)
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Compiler Version Notes

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
Version 2021.1 Build 20201113 |
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Compiler Version Notes (Continued)

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<th>Fortran</th>
<th>503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)</th>
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(3.00 GHz, Intel Xeon Gold 5317)

Spec®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(3.00 GHz, Intel Xeon Gold 5317)

Spec®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 231
SPECrate®2017_fp_peak = 237

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

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

Base Portability Flags

503. bwaves_r: -DSPEC_LP64
507. cactuBSSN_r: -DSPEC_LP64
508. namd_r: -DSPEC_LP64
510. parest_r: -DSPEC_LP64
511. povray_r: -DSPEC_LP64
519. lbm_r: -DSPEC_LP64
521. wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526. blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527. cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538. imagick_r: -DSPEC_LP64
544. nab_r: -DSPEC_LP64
549. fotoni3d_r: -DSPEC_LP64
554. roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-fflto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
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SPECrates

SPECrate®2017_fp_base = 231
SPECrate®2017_fp_peak = 237

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

Base Optimization Flags (Continued)

C++ benchmarks:
-`-w` `-m64` `-Wl,-z,muldefs` `-xCORE-AVX512` `-Ofast` `-ffast-math` `-flto`
-`-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4`
-`-mbranches-within-32B-boundaries` `-ljemalloc`
-`-L/usr/local/jemalloc64-5.0.1/lib`

Fortran benchmarks:
-`-w` `-m64` `-Wl,-z,muldefs` `-xCORE-AVX512` `-O3` `-ipo` `-no-prec-div`
-`-qopt-prefetch` `-ffinite-math-only`
-`-qopt-multiple-gather-scatter-by-shuffles` `-qopt-mem-layout-trans=4`
-`-nostandard-realloc-lhs` `-align array32byte` `-auto`
-`-mbranches-within-32B-boundaries` `-ljemalloc`
-`-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
-`-w` `-m64` `-std=c11` `-Wl,-z,muldefs` `-xCORE-AVX512` `-Ofast` `-ffast-math`
-`-flto` `-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4` `-O3` `-ipo`
-`-no-prec-div` `-qopt-prefetch` `-ffinite-math-only`
-`-qopt-multiple-gather-scatter-by-shuffles`
-`-mbranches-within-32B-boundaries` `-nostandard-realloc-lhs`
-`-align array32byte` `-auto` `-ljemalloc` `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:
-`-w` `-m64` `-std=c11` `-Wl,-z,muldefs` `-xCORE-AVX512` `-Ofast` `-ffast-math`
-`-flto` `-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4`
-`-mbranches-within-32B-boundaries` `-ljemalloc`
-`-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using Fortran, C, and C++:
-`-w` `-m64` `-std=c11` `-Wl,-z,muldefs` `-xCORE-AVX512` `-Ofast` `-ffast-math`
-`-flto` `-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4` `-O3`
-`-no-prec-div` `-qopt-prefetch` `-ffinite-math-only`
-`-qopt-multiple-gather-scatter-by-shuffles`
-`-mbranches-within-32B-boundaries` `-nostandard-realloc-lhs`
-`-align array32byte` `-auto` `-ljemalloc` `-L/usr/local/jemalloc64-5.0.1/lib`

Peak Compiler Invocation

C benchmarks:
-`icx`

C++ benchmarks:
-`icpx`

(Continued on next page)
Hewlett Packard Enterprise
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SPEC CPU®2017 Floating Point Rate Result

SPECratenormfp_base = 231
SPECratenormfp_peak = 237

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

Test Date: Aug-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

Peak Compiler Invocation (Continued)

Fortran benchmarks:
  ifort

Benchmarks using both Fortran and C:
  ifort icx

Benchmarks using both C and C++:
  511.povray_r: icpc icc
  526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:
  icpx icx ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
  519.lbm_r: basepeak = yes
  538.imagick_r: basepeak = yes
  544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
             -Ofast -qopt-mem-layout-trans=4
             -fimf-accuracy-bits=14:sqrt
             -mbranches-within-32B-boundaries -ljemalloc
             -L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
  508.namd_r: basepeak = yes
  510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
                 -flto -mfpmath=sse -funroll-loops
                 -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
                 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

(Continued on next page)
Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -03 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -03
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.xml
### SPEC CPU®2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
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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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