**SPEC CPU® 2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.50 GHz, Intel Xeon Gold 5215M)

<table>
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**SPECrate® 2017_fp_base = 128**

**SPECrate® 2017_fp_peak = Not Run**

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<tr>
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<tr>
<td>538.imagick_r</td>
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<tr>
<td>544.nab_r</td>
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<tr>
<td>549.fotonik3d_r</td>
</tr>
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<td>554.roms_r</td>
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</table>

**Hardware**

CPU Name: Intel Xeon Gold 5215M
Max MHz: 3400
Nominal: 2500
Enabled: 20 cores, 2 chips, 2 threads/core
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: 13.75 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 400 GB SAS SSD, RAID 0
Other: None

**Software**

OS: SUSE Linux Enterprise Server 15 (x86_64)
Kernel 4.12.14-23-default
Compiler: C/C++: Version 19.0.2.187 of Intel C/C++
Compiler Build 20190117 for Linux;
Fortran: Version 19.0.2.187 of Intel Fortran
Compiler Build 20190117 for Linux
Parallel: No
Firmware: HPE BIOS Version U32 05/21/2019 released Apr-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: --
Hewlett Packard Enterprise
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SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

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

Results Table

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</table>

SPECrate®2017_fp_base = 128
SPECrate®2017_fp_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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
runcpu command invoked through numactl i.e.:
  numactl --interleave=all runcpu <etc>

General Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"
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.

(Continued on next page)
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(Test Sponsor: HPE)
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SPECrate®2017_fp_peak = Not Run

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

General Notes (Continued)
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:
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 Throughput Compute
Workload Profile set to Custom
Energy/Performance Bias set to Balanced Performance
Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-pe3i Tue Jul 30 12:36:57 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) Gold 5215M CPU @ 2.50GHz
  2. "physical id"s (chips)
  40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
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SPECrate®2017_fp_base = 128
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CPU2017 License: 3
Test Sponsor: HPE
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CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5215M CPU @ 2.50GHz
Stepping: 6
CPU MHz: 2500.000
BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39

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
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdkg fma cx16 xtpr pdcm pcd 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 cdpl3 invpcid_single intel_pni mba tpr_shadow vni flexpriority ept
vpid fsgsb mmm tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rdt_a
avx512f avx512dq rdseed adx clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup LLC cqm_mbm_total cqm_mbm_local
ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

/platform Notes (Continued)

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 20 21 22 23 24 25 26 27 28 29
node 0 size: 193118 MB
node 0 free: 192728 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 193502 MB
node 1 free: 193024 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo

MemTotal: 395899996 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

(Continued on next page)
Hewlett Packard Enterprise
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SPECrates
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SPECrate®2017_fp_base = 128
SPECrate®2017_fp_peak = Not Run

Platform Notes (Continued)

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-pe3i 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 Jul 30 12:34

SPEC is set to: /home/cpu2017_u2
    Filesystem  Type  Size  Used Avail Use% Mounted on
    /dev/sda3   xfs   476G   73G  404G  16% /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 U32 05/21/2019
Memory:
    24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
| C | 519.ibm_r(base) 538.imagick_r(base) 544.nab_r(base) |
==============================================================================
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
    Version 19.0.2.187 Build 20190117
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(Continued on next page)
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Tested by: HPE

SPECrater®2017_fp_base = 128
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Compiler Version Notes (Continued)

==============================================================================
C++             | 508.namd_r(base) 510.parest_r(base)
-----------
Intel(R) C++ 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.
==============================================================================

C++, C          | 511.povray_r(base) 526.blender_r(base)
-----------
Intel(R) C++ 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.
-----------------------------------------------------------------------------

C++, C, Fortran | 507.cactuBSSN_r(base)
-----------
Intel(R) C++ 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.
Intel(R) C 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.
Intel(R) Fortran 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.
-----------------------------------------------------------------------------

Fortran         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
-----------
Intel(R) Fortran 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.
-----------------------------------------------------------------------------

Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
-----------
Intel(R) Fortran 64 Compiler for applications running on Intel(R) 64,
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.2.187 Build 20190117  
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**Base Compiler Invocation**

C benchmarks:  
icc -m64 -std=c11

C++ benchmarks:  
icpc -m64

Fortran benchmarks:  
ifort -m64

Benchmarks using both Fortran and C:  
ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:  
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:  
icpc -m64 icc -m64 -std=c11 ifort -m64

**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.fotonik3d_r: -DSPEC_LP64  
554.roms_r: -DSPEC_LP64
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**Base Optimization Flags**

C benchmarks:
-xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch  -ffinite-math-only  
-qopt-mem-layout-trans=4

C++ benchmarks:
-xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch  -ffinite-math-only  
-qopt-mem-layout-trans=4

Fortran benchmarks:
-xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch  -ffinite-math-only  
-qopt-mem-layout-trans=4  -auto  -nostandard-realloc-lhs  
-align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch  -ffinite-math-only  
-qopt-mem-layout-trans=4  -auto  -nostandard-realloc-lhs  
-align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch  -ffinite-math-only  
-qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch  -ffinite-math-only  
-qopt-mem-layout-trans=4  -auto  -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-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  
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-03.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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