Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(3.30 GHz, Intel Xeon Gold 6234)

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

SPECrate®2017_fp_base = 140
SPECrate®2017_fp_peak = Not Run

Hardware
CPU Name: Intel Xeon Gold 6234
Max MHz: 4000
Nominal: 3300
Enabled: 16 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: 24.75 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 02/02/2019 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: --
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Results Table

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</tbody>
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SPECrate®2017_fp_base = 140  
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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SPECrater®2017_fp_base = 140
SPECrater®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 Mon Jun 24 10:23:45 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 6234 CPU @ 3.30GHz
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: 8
siblings: 16
physical 0: cores 2 9 20 24 25 26 27
physical 1: cores 2 3 4 9 17 18 25 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel

(Continued on next page)
Platform Notes (Continued)

CPU family:          6
Model:               85
Model name:          Intel(R) Xeon(R) Gold 6234 CPU @ 3.30GHz
Stepping:            7
CPU MHz:             3300.000
BogoMIPS:            6600.00
Virtualization:      VT-x
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            25344K
NUMA node0 CPU(s):   0-3,16-19
NUMA node1 CPU(s):   4-7,20-23
NUMA node2 CPU(s):   8-11,24-27
NUMA node3 CPU(s):   12-15,28-31
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 pdpe1gb rdscopl
constant_tsc art arch_perfmon pebs bts rep_good noplapl xtopology nonstop_tsc cpuid
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbe fma cx16 xtrm pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt
node_distances:
node   0   1   2   3

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 16 17 18 19
  node 0 size: 96352 MB
  node 0 free: 95994 MB
  node 1 cpus: 4 5 6 7 20 21 22 23
  node 1 size: 96766 MB
  node 1 free: 96540 MB
  node 2 cpus: 8 9 10 11 24 25 26 27
  node 2 size: 96737 MB
  node 2 free: 96580 MB
  node 3 cpus: 12 13 14 15 28 29 30 31
  node 3 size: 96765 MB
  node 3 free: 96639 MB
  node distances:
  node 0 1 2 3
SPEC CPU®2017 Floating Point Rate Result

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SPECrater®2017_fp_base = 140
SPECrater®2017_fp_peak = Not Run

<table>
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<th>CPU2017 License: 3</th>
<th>Test Date: Jun-2019</th>
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<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Apr-2019</td>
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<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

0:  10  21  31  31
1:  21  10  31  31
2:  31  31  10  21
3:  31  31  21  10

From /proc/meminfo
MemTotal:  395901168 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-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 Jun 24 10:21

SPEC is set to: /home/cpu2017_u2
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sda3   xfs   476G  54G  423G  12% /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 02/02/2019
Memory:
24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)
### SPEC CPU®2017 Floating Point Rate Result

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**SPECrater®2017_fp_base = 140**

**SPECrater®2017_fp_peak = Not Run**

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### Compiler Version Notes

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<td>C</td>
<td>519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)</td>
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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  
|                      | Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |
|                      |
| C++                 | 508.namd_r(base) 510.parest_r(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. |
|                      |
| C++, C              | 511.povray_r(base) 526.blender_r(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. |
|                      | 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. |
|                      | 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. |
|                      |
| C++, C, Fortran     | 507.cactuBSSN_r(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. |
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|                      | 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 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)
Compiler Version Notes (Continued)

==============================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
==============================================================================

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

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

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Base Portability Flags (Continued)

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

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
## SPEC CPU®2017 Floating Point Rate Result

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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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