Hewlett Packard Enterprise  
ProLiant DL360 Gen10  
(3.00 GHz, Intel Xeon Gold 5217)

SPECrater2017_fp_base = 116
SPECrater2017_fp_peak = Not Run

| Copies | 503.bwaves_r | 32 | 507.cactuBSSN_r | 32 | 508.namd_r | 32 | 510.parest_r | 32 | 511.povray_r | 32 | 519.lbm_r | 32 | 521.wrf_r | 32 | 526.blender_r | 32 | 527.cam4_r | 32 | 538.imagick_r | 32 | 544.nab_r | 32 | 549.fotonik3d_r | 32 | 554.roms_r | 32 |
|---------|--------------|----|-----------------|----|------------|----|---------------|----|--------------|----|------------|----|------------|----|---------------|----|------------|----|--------------|----|------------|----|
|         | 0            | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 | 375 | 390 | 405 | 420 | 435 | 450 | 465 | 480 | 495 | 510 | 525 | 540 | 555 |
|         |              |      |      |      |      |      |      |      | 85.5 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      | 79.7 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      | 63.0 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      |      | 126 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      |      |      | 76.7 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      |      |      |      |      | 137 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      |      |      |      |      |      | 1144 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 113 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 115 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|         |              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 57.9 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

--- SPECrate2017_fp_base (116) ---

**Hardware**

- **CPU Name:** Intel Xeon Gold 5217
- **Max MHz.:** 3700
- **Nominal:** 3000
- **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:** 11 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933V-R, running at 2666)
- **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
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(3.00 GHz, Intel Xeon Gold 5217)

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

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>503.bwaves_r</td>
<td>32</td>
<td>997</td>
<td>322</td>
<td>996</td>
<td>322</td>
<td>996</td>
<td>322</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>32</td>
<td>473</td>
<td>85.7</td>
<td>474</td>
<td>85.5</td>
<td>474</td>
<td>85.5</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>32</td>
<td>381</td>
<td>79.7</td>
<td>381</td>
<td>79.7</td>
<td>381</td>
<td>79.7</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>32</td>
<td>1318</td>
<td>63.5</td>
<td>1328</td>
<td>63.0</td>
<td>1332</td>
<td>62.9</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>32</td>
<td>592</td>
<td>126</td>
<td>592</td>
<td>126</td>
<td>591</td>
<td>126</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>32</td>
<td>440</td>
<td>76.7</td>
<td>440</td>
<td>76.7</td>
<td>440</td>
<td>76.6</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>32</td>
<td>522</td>
<td>137</td>
<td>521</td>
<td>138</td>
<td>523</td>
<td>137</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>32</td>
<td>427</td>
<td>114</td>
<td>427</td>
<td>114</td>
<td>427</td>
<td>114</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>32</td>
<td>496</td>
<td>113</td>
<td>494</td>
<td>113</td>
<td>491</td>
<td>114</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>32</td>
<td>327</td>
<td>244</td>
<td>326</td>
<td>244</td>
<td>305</td>
<td>261</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>32</td>
<td>309</td>
<td>174</td>
<td>309</td>
<td>174</td>
<td>307</td>
<td>175</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>32</td>
<td>1082</td>
<td>115</td>
<td>1087</td>
<td>115</td>
<td>1087</td>
<td>115</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>32</td>
<td>880</td>
<td>57.8</td>
<td>877</td>
<td>58.0</td>
<td>878</td>
<td>57.9</td>
</tr>
</tbody>
</table>

SPECrate2017_fp_base = 116
SPECrate2017_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.
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(3.00 GHz, Intel Xeon Gold 5217)

| SPECrate2017_fp_base = 116 |
| SPECrate2017_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-nub3 Wed May 22 11:40:18 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 5217 CPU @ 3.00GHz
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 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architectures: 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): 2
Vendor ID: GenuineIntel

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(3.00 GHz, Intel Xeon Gold 5217)

SPECrate2017_fp_base = 116
SPECrate2017_fp_peak = Not Run

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5217 CPU @ 3.00GHz
Stepping: 6
CPU MHz: 3000.000
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
Flags: fpu vme de pse sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor 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 ebx cat_13 cdp_l3 invpcid_single intel_pplt mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 irds invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl rsaesopt xsaves cqm_llc cqm_occmap llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
    cache size : 11264 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 16 17 18 19 20 21 22 23
    node 0 size: 193120 MB
    node 0 free: 192760 MB
    node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
    node 1 size: 193503 MB
    node 1 free: 193148 MB
    node distances:
        node 0 1
        0: 10 21
        1: 21 10

From /proc/meminfo
    MemTotal: 395902636 kB
    HugePages_Total: 0
    Hugepagesize: 2048 kB

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(3.00 GHz, Intel Xeon Gold 5217)

SPECrate2017.fp_base = 116
SPECrate2017.fp_peak = Not Run

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

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-nub3 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 May 22 11:38

SPEC is set to: /home/cpu2017_u2
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda1      xfs   373G  110G  264G  30% /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 2933, configured at 2666

(End of data from sysinfo program)

Compiler Version Notes

=============================================================================
| CC  519.lbm_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
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
(Continued on next page)
### Compiler Version Notes (Continued)

```plaintext
CXXC 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.

CC  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.

FC  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.

FC  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.

CC  521.wrf_r(base) 527.cam4_r(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
```

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(3.00 GHz, Intel Xeon Gold 5217)

SPECrate2017_fp_base = 116
SPECrate2017_fp_peak = Not Run

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

Compiler Version Notes (Continued)

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.

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
## 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-revA.html](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.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-Platform-Flags-Intel-V1.2-CLX-revA.xml)