**SPEC® CPU2017 Floating Point Speed Result**

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.60 GHz, Intel Xeon Gold 6240)

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**SPECspeed2017_fp_base** = 126
**SPECspeed2017_fp_peak** = Not Run

| Threads | 0 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 |
|---------|---|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 603.bwaves_s | 72 | 139 |
| 607.cactuBSSN_s | 72 | 86.6 |
| 619.lbm_s | 72 | 129 |
| 621.wrf_s | 72 | 59.2 |
| 627.cam4_s | 72 | 112 |
| 628.pop2_s | 72 | 111 |
| 638.imagick_s | 72 | |
| 644.nab_s | 72 | 245 |
| 649.fotonik3d_s | 72 | 77.8 |
| 654.roms_s | 72 | 110 |

**Hardware**

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon Gold 6240</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz</td>
<td>3900</td>
</tr>
<tr>
<td>Nominal</td>
<td>2600</td>
</tr>
<tr>
<td>Enabled</td>
<td>36 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1, 2 chip(s)</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
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<tr>
<td>Memory</td>
<td>384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 400 GB SAS SSD, RAID 0</td>
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<tr>
<td>Other</td>
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**Software**

<table>
<thead>
<tr>
<th>OS</th>
<th>SUSE Linux Enterprise Server 15 (x86_64)</th>
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<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.2.187 of Intel C/C++</td>
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<tr>
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<td>Compiler Build 20190117 for Linux;</td>
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<td>Parallel</td>
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<td>Firmware</td>
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<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
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<tr>
<td>Base Pointers</td>
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</tr>
<tr>
<td>Peak Pointers</td>
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<td>Other</td>
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

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

Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<td>426</td>
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<td>426</td>
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<td>427</td>
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<td>607.cactuBSSN_s</td>
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<td>139</td>
<td>120</td>
<td>139</td>
<td>120</td>
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<td>619.lbm_s</td>
<td>72</td>
<td>60.5</td>
<td>86.6</td>
<td>61.1</td>
<td>85.7</td>
<td>60.1</td>
<td>87.1</td>
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<td>627.cam4_s</td>
<td>72</td>
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<td>112</td>
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<td>112</td>
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<td>59.2</td>
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<td>59.2</td>
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<td>117</td>
<td>77.8</td>
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<tr>
<td>654.roms_s</td>
<td>72</td>
<td>144</td>
<td>110</td>
<td>143</td>
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<td>142</td>
<td>111</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 126
SPECspeed2017_fp_peak = Not Run

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

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=core,compact"
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"
OMP_STACKSIZE = "192M"

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:
Thermal Configuration set to Maximum Cooling
Memory Patrol Scrubbing set to Disabled

(Continued on next page)
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**ProLiant DL360 Gen10**  
(2.60 GHz, Intel Xeon Gold 6240)

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

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<td>Apr-2019</td>
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<td>Software Availability:</td>
<td>Feb-2019</td>
</tr>
</tbody>
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#### Platform Notes (Continued)

- 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
- Energy/Performance Bias set to Balanced Power
- Workload Profile set to Custom
- Numa Group Size Optimization set to Flat
- Intel UPI Link Power Management set to Enabled
- Sysinfo program `/home/cpu2017_u2/bin/sysinfo`

**Sysinfo program info:**  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-pe3i Sun Jun 16 15:43:02 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

**From /proc/cpuinfo**

- model name : Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
- 2 "physical id"s (chips)
- 72 "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 : 18
  - siblings : 36
  - physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  - physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

**From lscpu:**

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 72
- On-line CPU(s) list: 0-71
- Thread(s) per core: 2
- Core(s) per socket: 18
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
- Stepping: 6
- CPU MHz: 2600.000
- BogoMIPS: 5200.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K

(Continued on next page)
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Platform Notes (Continued)

L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17,36-53
NUMA node1 CPU(s): 18-35,54-71
Flags: fpu vme de pse tsc mtrr pae mca cmov
pat pse36 clflush dtc 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
aperfmrperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtpr pdcm pciid dca sse4_1 sse4_2 x2apic movbe popcnt
tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
epb cat_l3 cdpl_l3 invpcid_single intel_pni mba tpr_shadow vmi flexpriority ept
vpid fsgsbase tsc_adjust bm1 hle avx2 smep bmi2 erms invpcid rtm cmx mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsaves xgetbv xsave 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

/proc/cpuinfo cache data
  cache size: 25344 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 16 17 36 37 38 39 40 41 42 43 44 45
     46 47 48 49 50 51 52 53
  node 0 size: 193115 MB
  node 0 free: 192447 MB
  node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 54 55 56 57 58 59 60
     61 62 63 64 65 66 67 68 69 70 71
  node 1 size: 193498 MB
  node 1 free: 193310 MB
  node distances:
  node 0 1
     0: 10 21
     1: 21 10

From /proc/meminfo
  MemTotal: 395892948 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"

(Continued on next page)
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</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```
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

```
runtime 3 Jun 16 15:40
```

```
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)

**Compiler Version Notes**

```
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(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  607.cactuBSSN_s(base)
```

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
```

(Continued on next page)
## Base Compiler Invocation

C benchmarks:
```bash
icc -m64 -std=c11
```

Fortran benchmarks:
```bash
ifort -m64
```

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

Benchmarks using Fortran, C, and C++:
```bash
icpc -m64 icc -m64 -std=c11 ifort -m64
```
## SPEC CPU2017 Floating Point Speed Result

### Hewlett Packard Enterprise

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**ProLiant DL360 Gen10**  
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**CPU2017 License:** 3  
**Test Sponsor:** HPE  
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**Test Date:** Jun-2019  
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### 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  
- 628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
- 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

**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

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](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/HPE-Platform-Flags-Intel-V1.2-CLX-revB.xml)
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<table>
<thead>
<tr>
<th>Specification</th>
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<td>SPECspeed2017_fp_base</td>
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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.5 on 2019-06-16 15:43:01-0400.  