**Hewlett Packard Enterprise**  
ProLiant DL360 Gen10  
(2.10 GHz, Intel Xeon Gold 6238L)

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<td>603.bwaves_s 88</td>
<td>88</td>
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</tr>
<tr>
<td>607.cactuBSSN_s 88</td>
<td>94.1</td>
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<tr>
<td>619.lbm_s 88</td>
<td>126</td>
<td>88</td>
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<tr>
<td>621.wrf_s 88</td>
<td>119</td>
<td>88</td>
</tr>
<tr>
<td>627.cam4_s 88</td>
<td>60.7</td>
<td>88</td>
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<tr>
<td>628.pop2_s 88</td>
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<tr>
<td>638.imagick_s 88</td>
<td>81.4</td>
<td>88</td>
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<tr>
<td>644.nab_s 88</td>
<td>247</td>
<td>88</td>
</tr>
<tr>
<td>649.fotonik3d_s 88</td>
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</tr>
<tr>
<td>654.roms_s 88</td>
<td>247</td>
<td>88</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6238L
- **Max MHz:** 3700
- **Nominal:** 2100
- **Enabled:** 44 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:** 30.25 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-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:** Yes
- **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:** --
SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.10 GHz, Intel Xeon Gold 6238L)

SPECspeed®2017_fp_base = 135
SPECspeed®2017_fp_peak = Not Run

Results Table

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<td>131</td>
<td>119</td>
<td>132</td>
<td>120</td>
<td>131</td>
</tr>
</tbody>
</table>

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)
## 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
- Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
- running on linux-nub3 Thu Jun 27 11:12:11 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 6238L CPU @ 2.10GHz
  2 "physical id"s (chips)
  88 "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 : 22
siblings : 44
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
```

From lscpu:

```
Architecture:         x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              88
On-line CPU(s) list: 0-87
Thread(s) per core:  2
Core(s) per socket:  22
Socket(s):           2
NUMA node(s):        2
Vendor ID:           GenuineIntel
CPU family:          6
Model:               85
Model name:          Intel(R) Xeon(R) Gold 6238L CPU @ 2.10GHz
Stepping:            7
CPU MHz:             2100.000
BogoMIPS:            4200.00
Virtualization:      VT-x
L1d cache:           32K
L1i cache:           32K
```

(Continued on next page)
## SPEC CPU 2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
*(Test Sponsor: HPE)*  
**ProLiant DL360 Gen10**  
*(2.10 GHz, Intel Xeon Gold 6238L)*  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>135</th>
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</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</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 |

### Platform Notes (Continued)

- **L2 cache:** 1024K
- **L3 cache:** 30976K
- **NUMA node0 CPU(s):** 0-21, 44-65
- **NUMA node1 CPU(s):** 22-43, 66-87
- **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 tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
  sdbg fxm mca cmov pxsr sse2 ssse sse3 ssh xenomit ms  xsave tu nx pdpe1gb rdtscp
  lm tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
  epb cat _13 cd p1 invert more_safe intel_pip mba tpr_shadow vmm flexpriority ept
  vpid fsgsbg tsc_adjust bmu hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
  avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
  xsaves vx save xgetbv xsave xsave cmap lll cqm_occup_lll cqm_mbm_total cqm_mbm_local
  ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

From `numastat --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 18 19 20 21 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
  - **node 0 size:** 193114 MB
  - **node 0 free:** 192486 MB
  - **node 1 cpus:** 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87
  - **node 1 size:** 193497 MB
  - **node 1 free:** 193282 MB
  - **node distances:**
    - **node 0 1**
    - **0:** 10 21
    - **1:** 21 10

From `/proc/meminfo`

- **MemTotal:** 395889976 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

From `/etc/*release*/`  
**os-release:**

- **NAME**="SLES"
- **VERSION**="15"
- **VERSION_ID**="15"
- **PRETTY_NAME**="SUSE Linux Enterprise Server 15"
- **ID**="sles"

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

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.10 GHz, Intel Xeon Gold 6238L)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
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<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>= Not Run</td>
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</table>

**CPU2017 License:** 3  
**Test Date:** Jun-2019  
**Test Sponsor:** HPE  
**Hardware Availability:** Apr-2019  
**Tested by:** HPE  
**Software Availability:** Feb-2019

---

### Platform Notes (Continued)

```sh
ID_LIKE="suse"  
ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:15"
```

```sh
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 Jun 27 11:09**

**SPEC is set to:** /home/cpu2017_u2
- **Filesystem** Type Size Used Avail Use% Mounted on
  - /dev/sda1 xfs 373G 134G 240G 36% /home

---

### Compiler Version Notes

```
C               | 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.
```

---

```
C++, C, Fortran | 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)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
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**SPEC CPU®2017 Floating Point Speed Result**

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**Hewlett Packard Enterprise**

**ProLiant DL360 Gen10**

(2.10 GHz, Intel Xeon Gold 6238L)

**SPECspeed®2017_fp_base = 135**

**SPECspeed®2017_fp_peak = Not Run**

---

**Compiler Version Notes (Continued)**

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.

---

Fortran         | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(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.

---

Fortran, C      | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(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.

---

**Base Compiler Invocation**

C benchmarks:

`icc -m64 -std=c11`

Fortran benchmarks:

`ifort -m64`

Benchmarks using both Fortran and C:

`ifort -m64 icc -m64 -std=c11`

Benchmarks using Fortran, C, and C++:

`icpc -m64 icc -m64 -std=c11 ifort -m64`
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.10 GHz, Intel Xeon Gold 6238L)

SPECspeed®2017_fp_base = 135
SPECspeed®2017_fp_peak = Not Run

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

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.ibm_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
-assume byterecl
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-ic19.0u1-flags-linux64.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-ic19.0u1-flags-linux64.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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