**SPEC® CPU2017 Floating Point Speed Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant ML350 Gen10
(2.80 GHz, Intel Xeon Gold 6242)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 135</th>
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<tbody>
<tr>
<td>SPECspeed2017_fp_peak = Not Run</td>
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<tr>
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<tr>
<td>Tested by:</td>
<td>HPE</td>
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<tr>
<td>Threads</td>
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<tr>
<td>603.bwaves_s</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<tr>
<td>619.lbm_s</td>
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<td>32</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
</tr>
</tbody>
</table>

**Hardware**

| CPU Name:         | Intel Xeon Gold 6242 |
| Max MHz.:         | 3900                |
| Nominal:          | 2800                |
| Enabled:          | 32 cores, 2 chips   |
| 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:               | 22 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**

<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>Fortran: Version 19.0.2.187 of Intel Fortran</td>
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<td>Parallel:</td>
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<tr>
<td>Firmware:</td>
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<td>File System:</td>
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<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>
<td>Peak Pointers:</td>
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<td>Other:</td>
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**SPECspeed2017_fp_base (135)**
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML350 Gen10  
(2.80 GHz, Intel Xeon Gold 6242)  

SPECspped2017_fp_base = 135  
SPECspped2017_fp_peak = Not Run

Results Table

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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
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<td>158</td>
<td>101</td>
<td>157</td>
<td>100</td>
<td>157</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=fine,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:
  - Hyper-Threading set to Disabled
  - Thermal Configuration set to Maximum Cooling

(Continued on next page)
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SPECspeed2017_fp_base = 135
SPECspeed2017_fp_peak = Not Run

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Platform Notes (Continued)

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 Peak Frequency Compute
Energy/Performance Bias set to Balanced Power
Workload Profile set to Custom
Numa Group Size Optimization set to Flat
Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9b68f2999c33d61f64985e45859ea9
running on ml350-sles15 Thu Apr 25 08:45:02 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

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Gold 6242 CPU @ 2.80GHz
  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 : 16
siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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:     1
Core(s) per socket:     16
Socket(s):              2
NUMA node(s):           2
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  85
Model name:             Intel(R) Xeon(R) Gold 6242 CPU @ 2.80GHz
Stepping:               7
CPU MHz:                2800.000
BogoMIPS:               5600.00
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: 22582K
NUMA node0 CPU(s): 0-15
NUMA node1 CPU(s): 16-31
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 rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfperf 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
ebp cat_l3 cdp_l3 invpcid_single intel_pinn mba tpr_shadow vni flexpriority ept
vpid fs.gsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsavinopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
ibpb ibrs stibp dtcptrm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
  cache size : 22528 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
  node 0 size: 193119 MB
  node 0 free: 192729 MB
  node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
  node 1 size: 193503 MB
  node 1 free: 193166 MB
  node distances:
     node 0 1
       0: 10 21
       1: 21 10

From /proc/meminfo
  MemTotal: 395901968 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"

(Continued on next page)
Platform Notes (Continued)

uname -a:
    Linux ml350-sles15 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 Apr 25 08:41

SPEC is set to: /home/cpu2017_u2
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sdb2 btrfs 371G 209G 161G 57% /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 U41 02/02/2019
    Memory:
        24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(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
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
(Continued on next page)
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| Test Sponsor:   | HPE |
| Tested by:      | HPE |

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

### Compiler Version Notes (Continued)

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  
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```
FC  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)  
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```
CC  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)  
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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

### Base Portability Flags

603.bwaves_s: –DSPEC_LP64  
(Continued on next page)
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Base Portability Flags (Continued)

607.cactuBSSN_s: -DSPEC_LP64
619.lbn_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 -DSPEC_CASE_FLAG
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
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
   -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
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
   -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
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
   -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-revA.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-revA.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.

Tested with SPEC CPU2017 v1.0.5 on 2019-04-24 23:15:01-0400.