## SPEC CPU®2017 Floating Point Speed Result

### Hardware

- **CPU Name:** Intel Xeon E-2246G
- **Max MHz:** 4800
- **Nominal:** 3600
- **Enabled:** 6 cores, 1 chip
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 256 KB I+D on chip per core
- **L3:** 12 MB I+D on chip per chip
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-U)
- **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 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
  Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux;
- **Parallel:** Yes
- **Firmware:** HPE BIOS Version U44 09/05/2019 released Nov-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None

---

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Value</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>6</td>
</tr>
<tr>
<td>619.lbm_s</td>
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</tr>
<tr>
<td>621.wrf_s</td>
<td>6</td>
</tr>
<tr>
<td>627.cam4_s</td>
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<tr>
<td>628.pop2_s</td>
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</tr>
<tr>
<td>638.imagick_s</td>
<td>6</td>
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<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>6</td>
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<tr>
<td>654.roms_s</td>
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</table>

### SPECspeed®2017_fp_base

- **Value:** 32.2

### SPECspeed®2017_fp_peak

- **Value:** Not Run

---

**Test Sponsor:** HPE

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Test Date:** Oct-2019

**Hardware Availability:** Nov-2019

**Tested by:** HPE

**Software Availability:** May-2019

**Test Sponsor:** HPE

**Hardware Availability:** Nov-2019

**Tested by:** HPE

**Software Availability:** May-2019

---

**603.bwaves_s**

- **Threads:** 6
- **Threads (32.2):** 52.8

**607.cactuBSSN_s**

- **Threads:** 6
- **Threads (52.8):** 39.8

**619.lbm_s**

- **Threads:** 6
- **Threads (52.8):** 26.0

**621.wrf_s**

- **Threads:** 6
- **Threads (52.8):** 36.5

**627.cam4_s**

- **Threads:** 6
- **Threads (52.8):** 30.0

**628.pop2_s**

- **Threads:** 6
- **Threads (52.8):** 58.1

**638.imagick_s**

- **Threads:** 6
- **Threads (52.8):** 17.1

**644.nab_s**

- **Threads:** 6
- **Threads (52.8):** 16.5

**649.fotonik3d_s**

- **Threads:** 6
- **Threads (52.8):** 16.5

**654.roms_s**

- **Threads:** 6
- **Threads (52.8):** 16.5

---

**SPECspeed®2017_fp_base (32.2)**
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML30 Gen10
(3.60 GHz, Intel Xeon E-2246G)

SPECspeed®2017_fp_base = 32.2
SPECspeed®2017_fp_peak = Not Run

Results Table

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<td>16.5</td>
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</tbody>
</table>

SPECspeed®2017_fp_base = 32.2
SPECspeed®2017_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
  ```

Environment Variables Notes

- Environment variables set by runcpu before the start of the run:
  ```
  KMP_AFFINITY = "granularity=fine,compact"
  LD_LIBRARY_PATH = "/home/cpu2017_u4/lib/intel64"
  OMP_STACKSIZE = "192M"
  ```

General Notes

- Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
- Yes: 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.
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML30 Gen10  
(3.60 GHz, Intel Xeon E-2246G)  

SPEC CPU®2017 Floating Point Speed Result  
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**Platform Notes**

BIOS Configuration:  
Hyper-Threading set to Disabled  
Thermal Configuration set to Maximum Cooling  
LLC Prefetch set to Enabled  
Workload Profile set to General Peak Frequency Compute  

Sysinfo program /home/cpu2017_u4/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011  
runtime on ml30-sles15 Fri Oct 18 14:31:22 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) E-2246G CPU @ 3.60GHz  
  1 "physical id"s (chips)  
  6 "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 : 6  
  siblings : 6  
  physical 0: cores 0 1 2 3 4 5

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 6  
On-line CPU(s) list: 0-5  
Thread(s) per core: 1  
Core(s) per socket: 6  
Socket(s): 1  
NUMA node(s): 1  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 158  
Model name: Intel(R) Xeon(R) E-2246G CPU @ 3.60GHz  
Stepping: 10  
CPU MHz: 3600.000  
BogoMIPS: 7200.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 256K  
L3 cache: 12288K  
NUMA node0 CPU(s): 0-5

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

**Software Availability:** May-2019  
**Test Sponsor:** HPE  
**Hardware Availability:** Nov-2019  
**Test Date:** Oct-2019

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
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<th>Tested by:</th>
<th>HPE</th>
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<td>Hardware Availability:</td>
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<td>Tested by:</td>
<td>HPE</td>
<td>Software Availability:</td>
<td>May-2019</td>
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</tbody>
</table>

**SPECspeed®2017_fp_base = 32.2**  
**SPECspeed®2017_fp_peak = Not Run**

**Hewlett Packard Enterprise**  
ProLiant ML30 Gen10  
(3.60 GHz, Intel Xeon E-2246G)

### Platform Notes (Continued)

- **Flags:**
  - fpu
  - vme
  - de
  - pse
  - tsc
  - mce
  - cx8
  - mmx
  - fxsr
  - sse
  - sse2
  - ss
  - ht
  - tm
  - pbe
  - syscall
  - nx
  - pdpe1gb
  - rdscp
  - lm
  - constant_tsc
  - art
  - arch_perfmon
  - pebs
  - bts
  - rep_good
  - nopl
  - xtopology
  - nonstop_tsc
  - cpuid
  - aperfmerf
  - tsc_known_freq
  - pni
  - pclmulqdq
  - dtes64
  - monitor
  - ds_cpl
  - vmx
  - smx
  - est
  - tm2
  - sse3
  - sdbg
  - fma
  - cx16
  - xtpr
  - pdcm
  - pcid
  - sse4_1
  - sse4_2
  - x2apic
  - movbe
  - popcnt
  - tsc_deadline_timer
  - aes
  - xsave
  - avx
  - f16c
  - rdrand
  - lahf_lm
  - abm
  - 3dnop
  - prefetch
  - cpuid_fault
  - epb
  - invpcid_single
  - pti
  - tpr_shadow
  - vmmi
  - flexpriority
  - ept
  - vpid
  - fs.gsbase
  - tsc_adjust
  - bmi1
  - hle
  - avx2
  - smep
  - bmi2
  - erms
  - invpcid
  - rtm
  - mpx
  - rdsseed
  - adx
  - smap
  - clflushopt
  - intel_pt
  - xsaveopt
  - xsave
  - xgetbv1
  - xsaves
  - ibpb
  - ibrs
  - stibp
  - dtherm
  - ida
  - arat
  - pln
  - pts
  - ssbd

- `/proc/cpuinfo` cache data
  - cache size: 12288 KB

- From `numactl --hardware`
  - WARNING: a numactl 'node' might or might not correspond to a physical chip.
  - available: 1 nodes (0)
  - node 0 cpus: 0 1 2 3 4 5
  - node 0 size: 64265 MB
  - node 0 free: 63778 MB
  - node distances:
  - node 0
    - 0: 10

- From `/proc/meminfo`
  - MemTotal: 65808100 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 ml30-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-2018-3620 (L1 Terminal Fault): No status reported
  - Microarchitectural Data Sampling: No status reported

(Continued on next page)
Platform Notes (Continued)

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass): Vulnerable
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 Oct 18 14:29
SPEC is set to: /home/cpu2017_u4
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 344G 74G 271G 22% /home

From /sys/devices/virtual/dmi/id
BIOS: HPE U44 09/05/2019
Vendor: HPE
Product: ProLiant ML30 Gen10
Product Family: ProLiant
Serial: CN68130P0X

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.
Memory:
4x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2667

(End of data from sysinfo program)

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 19.0.4.227 Build 20190416
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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML30 Gen10
(3.60 GHz, Intel Xeon E-2246G)

SPECspeed®2017_fp_base = 32.2
SPECspeed®2017_fp_peak = Not Run

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Compiler Version Notes (Continued)

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R)
64, Version 19.0.4.227 Build 20190416
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

Base Portability Flags

603.bwaves_s: ~DSPEC_LP64
607.cactuBSSN_s: ~DSPEC_LP64

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML30 Gen10
(3.60 GHz, Intel Xeon E-2246G)

SPECspeed®2017_fp_base = 32.2
SPECspeed®2017_fp_peak = Not Run

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

Test Date: Oct-2019
Hardware Availability: Nov-2019
Software Availability: May-2019

Base Portability Flags (Continued)

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
   -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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX2 -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-AVX2 -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-AVX2 -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

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
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**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML30 Gen10  
(3.60 GHz, Intel Xeon E-2246G)

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

**Test Details**  
Test Date: Oct-2019  
Hardware Availability: Nov-2019  
Software Availability: May-2019  

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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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