### SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
**Synergy 480 Gen10**  
(3.10 GHz, Intel Xeon Gold 6242R)  

**SPECspeed®2017_fp_base = 150**  
**SPECspeed®2017_fp_peak = 151**

<table>
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<tr>
<th>Test Date:</th>
<th>Feb-2020</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Feb-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Jun-2019</td>
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#### Hardware

<table>
<thead>
<tr>
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<th>SPECspeed®2017_fp_peak (151)</th>
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<tr>
<td>603.bwaves_s</td>
<td>40</td>
<td>167</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>40</td>
<td>168</td>
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<td>619.ibm_s</td>
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<td>108</td>
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<tr>
<td>621.wrf_s</td>
<td>40</td>
<td>139</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>40</td>
<td>146</td>
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<td>628.pop2_s</td>
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<tr>
<td>638.imagick_s</td>
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<td>40</td>
<td>278</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>40</td>
<td>86.6</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>40</td>
<td>148</td>
</tr>
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</table>

#### Software

- **OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
  Kernel 4.12.14-195-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 I42 v2.22 (11/13/2019) released Feb-2020
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage

#### CPU Details

- **CPU Name:** Intel Xeon Gold 6242R  
- **Max MHz:** 4100  
- **Nominal:** 3100  
- **Enabled:** 40 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:** 35.75 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

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(Test Sponsor: HPE)
Synergy 480 Gen10
(3.10 GHz, Intel Xeon Gold 6242R)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
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</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 150
SPECspeed®2017_fp_peak = 151

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/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
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
- 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
- Intel UPI Link Power Management set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbl6e646a485a0011
running on linux-96aw Fri Feb 28 04:29:21 2020

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 6242R CPU @ 3.10GHz
  2 "physical id"s (chips)
  40 "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 : 20
  siblings : 20
  physical 0: cores 1 2 3 5 8 9 10 12 13 16 17 18 19 20 21 26 27 28 29
  physical 1: cores 0 1 2 3 5 6 8 9 10 12 13 16 18 19 20 21 26 27 28 29

From lscpu:
  Architecture:         x86_64
  CPU op-mode(s):       32-bit, 64-bit
  Byte Order:           Little Endian
  Address sizes:        46 bits physical, 48 bits virtual
  CPU(s):               40
  On-line CPU(s) list:  0-39
  Thread(s) per core:   1
  Core(s) per socket:   20
  Socket(s):            2
  NUMA node(s):         2
  Vendor ID:            GenuineIntel
  CPU family:           6
  Model:                85
  Model name:           Intel(R) Xeon(R) Gold 6242R CPU @ 3.10GHz

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SPECspeed®2017_fp_base = 150
SPECspeed®2017_fp_peak = 151

Test Date: Feb-2020
Hardware Availability: Feb-2020
Software Availability: Jun-2019

Platform Notes (Continued)

Stepping: 7
CPU MHz: 3100.000
BogoMIPS: 6200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-19
NUMA node1 CPU(s): 20-39
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 pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtral pdcm pcid 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 cdp_l3
invpcid_single intel_puin ssbd mba ibrs ibpb ibrs _enhanced tpr_shadow vnmi
flexpriority ept vpid fsgsbse tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpox rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld
arch_capabilities

/proc/cpuinfo cache data
  cache size: 36608 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 18 19
  node 0 size: 193054 MB
  node 0 free: 192468 MB
  node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
  node 1 size: 193304 MB
  node 1 free: 193074 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395631752 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

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

(Continued on next page)
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Platform Notes (Continued)

NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
Linux linux-96aw 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Feb 28 04:27

SPEC is set to: /home/cpu2017

From /sys/devices/virtual/dmi/id
BIOS: HPE I42 11/13/2019
Vendor: HPE
Product: Synergy 480 Gen10
Product Family: Synergy
Serial: MXQ72204FC

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:

24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(End of data from sysinfo program)
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### Compiler Version Notes

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<th>Applications</th>
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<td>619.lbm_s(base, peak) 638.imagick_s(base, peak)</td>
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<tr>
<td></td>
<td>644.nab_s(base, peak)</td>
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<tr>
<td><strong>C++, C, Fortran</strong></td>
<td>607.cactuBSSN_s(base, peak)</td>
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<td><strong>Fortran</strong></td>
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<td><strong>Fortran, C</strong></td>
<td>621.wrf_s(base, peak) 627.cam4_s(base, peak)</td>
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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
- 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 -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

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
\texttt{-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch}
\texttt{-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP}
\texttt{-nostandard-realloc-lhs}

Peak Compiler Invocation

C benchmarks:
\texttt{icc -m64 -std=c11}

Fortran benchmarks:
\texttt{ifort -m64}

Benchmarks using both Fortran and C:
\texttt{ifort -m64 icc -m64 -std=c11}

Benchmarks using Fortran, C, and C++:
\texttt{icpc -m64 icc -m64 -std=c11 ifort -m64}

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
\texttt{-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch}
\texttt{-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP}

Fortran benchmarks:
\texttt{603.bwaves\_s: prof-gen(pass 1) prof-use(pass 2) DSPEC\_SUPPRESS\_OPENMP}
\texttt{-DSPEC\_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3}
\texttt{-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4}
\texttt{-qopenmp -nostandard-realloc-lhs}
\texttt{649.fotonik3d\_s: Same as 603.bwaves\_s}
\texttt{654.roms\_s: DSPEC\_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div}
\texttt{-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4}

(Continued on next page)
Hewlett Packard Enterprise
(3.10 GHz, Intel Xeon Gold 6242R)

SPECspeed\textsuperscript{	extregistered}2017\textunderscore fp\textunderscore peak = 151
SPECspeed\textsuperscript{	extregistered}2017\textunderscore fp\textunderscore base = 150

Peak Optimization Flags (Continued)

654.roms\_s (continued):
-\texttt{qopenmp} -\texttt{nostandard-realloc-lhs}

Benchmarks using both Fortran and C:

621.wrf\_s: \texttt{-prof-gen(pass 1)} \texttt{-prof-use(pass 2)} \texttt{-O2} \texttt{-xCORE-AVX512}
-\texttt{qopt-prefetch} \texttt{-ipo -O3 -ffinite-math-only -no-prec-div}
-\texttt{qopt-mem-layout-trans=4} \texttt{-DSPEC\_SUPPRESS\_OPENMP -qopenmp}
-\texttt{DSPEC\_OPENMP -nostandard-realloc-lhs}

627.cam4\_s: \texttt{-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch}
-\texttt{ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp}
-\texttt{DSPEC\_OPENMP -nostandard-realloc-lhs}

628.pop2\_s: Same as 621.wrf\_s

Benchmarks using Fortran, C, and C++:

-\texttt{xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch}
-\texttt{ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP}
-\texttt{qopenmp -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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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