Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(3.80 GHz, Intel Xeon Gold 5222)

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

SPECspeed2017_fp_base = 59.7
SPECspeed2017_fp_peak = Not Run

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

--- SPECspeed2017_fp_base (59.7) ---

**Threads**

<table>
<thead>
<tr>
<th>SPECspeed</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_base</td>
<td>59.7</td>
</tr>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**Hardware**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 5222</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>3900</td>
</tr>
<tr>
<td>Nominal</td>
<td>3800</td>
</tr>
<tr>
<td>Enabled</td>
<td>8 cores, 2 chips</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>16.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 400 GB SAS SSD, RAID 0</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

**Software**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td>Kernel</td>
<td>4.12.14-23-default</td>
</tr>
<tr>
<td>Compiler C++</td>
<td>Version 19.0.2.187 of Intel C/C++</td>
</tr>
<tr>
<td>Compiler Build</td>
<td>20190117 for Linux</td>
</tr>
<tr>
<td>Fortran</td>
<td>Version 19.0.2.187 of Intel Fortran</td>
</tr>
<tr>
<td>Firmware</td>
<td>HPE BIOS Version I42 02/02/2019 released Apr-2019</td>
</tr>
<tr>
<td>File System</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>
SPEC CPU2017 Floating Point Speed Result

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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>8</td>
<td>195</td>
<td>302</td>
<td>195</td>
<td>303</td>
<td>196</td>
<td>301</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>8</td>
<td>306</td>
<td>54.4</td>
<td>303</td>
<td>55.0</td>
<td>304</td>
<td>54.9</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>112</td>
<td>46.6</td>
<td>112</td>
<td>46.7</td>
<td>112</td>
<td>46.7</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>219</td>
<td>60.5</td>
<td>217</td>
<td>60.9</td>
<td>218</td>
<td>60.7</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>268</td>
<td>33.1</td>
<td>267</td>
<td>33.2</td>
<td>266</td>
<td>33.3</td>
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<tr>
<td>628.pop2_s</td>
<td>8</td>
<td>252</td>
<td>47.0</td>
<td>253</td>
<td>47.0</td>
<td>251</td>
<td>47.3</td>
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<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>400</td>
<td>36.0</td>
<td>400</td>
<td>36.0</td>
<td>401</td>
<td>35.9</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>8</td>
<td>271</td>
<td>64.5</td>
<td>271</td>
<td>64.5</td>
<td>271</td>
<td>64.4</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>8</td>
<td>153</td>
<td>59.7</td>
<td>152</td>
<td>60.1</td>
<td>153</td>
<td>59.8</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>8</td>
<td>278</td>
<td>56.7</td>
<td>278</td>
<td>56.6</td>
<td>279</td>
<td>56.4</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 59.7
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:
Hyper-Threading set to Disabled
Thermal Configuration set to Maximum Cooling
(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

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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
Intel UPI Link Power Management set to Enabled
Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on sy480g10-2 Thu May 23 15:54:36 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 5222 CPU @ 3.80GHz
  2 "physical id"s (chips)
  8 "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 : 4
siblings : 4
physical 0: cores 5 8 9 13
physical 1: cores 5 8 9 13

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5222 CPU @ 3.80GHz
Stepping: 7
CPU MHz: 3800.000
BogoMIPS: 7600.00
Virtualization: VT-x
L1d cache: 32K

(Continued on next page)
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Test Date: May-2019
Hardware Availability: Apr-2019
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Platform Notes (Continued)

L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-3
NUMA node1 CPU(s): 4-7
Flags: fpu vme de pse tsc msr pae 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 aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpre pdcmt pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat l3 cd tsc_adjust bm1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdts a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsave xgetbv1 xsaves cqm_llc cqm_occup llc cqm_mbb_total cqm_mbb_local ibpb ibrs stibp dtc Path ide arat pin pts pk u ospke avx512_vnni arch_capabilities ssbd

From /proc/cpuinfo cache data
  cache size : 16896 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
    node 0 size: 193049 MB
    node 0 free: 192770 MB
    node 1 cpus: 4 5 6 7
    node 1 size: 193308 MB
    node 1 free: 192854 MB
  node distances:
    node 0 1
    0: 1 0 10 21
    1: 21 11 0

From /proc/meminfo
  MemTotal: 395631092 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"

(Continued on next page)
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Platform Notes (Continued)

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

uname -a:
Linux sy480g10-2 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 May 23 15:52

SPEC is set to: /home/cpu2017_u2

Filesystem     Type   Size  Used Avail Use% Mounted on
/dev/sdb2      btrfs  371G   91G  280G  25% /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 142 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.

(Continued on next page)
Compiler Version Notes (Continued)

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.

-------------------------------------
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)
64, Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-------------------------------------

-------------------------------------
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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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.
-------------------------------------

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
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Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.hm_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 byteinc
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
-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-ic19.0u1-flags-linux64.html
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revB.html
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<th>59.7</th>
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<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
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You can also download the XML flags sources by saving the following links:  
http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.xml  
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.  

Tested with SPEC CPU2017 v1.0.5 on 2019-05-23 16:54:35-0400.  