## SPEC® CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.70 GHz, Intel Xeon Platinum 8280M)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>10.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### Test Details
- **CPU2017 License:** 3  
- **Test Sponsor:** HPE  
- **Tested by:** HPE  
- **Test Date:** Apr-2019  
- **Hardware Availability:** Apr-2019  
- **Software Availability:** Nov-2018

### Hardware
- **CPU Name:** Intel Xeon Platinum 8280M  
- **Max MHz.:** 4000  
- **Nominal:** 2700  
- **Enabled:** 56 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:** 38.5 MB I+D on chip per chip  
- **Orderable:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 1 x 960 GB SATA SSD, RAID 0  
- **Other:** None

### Software
- **OS:** SUSE Linux Enterprise Server 15 (x86_64)  
- **Kernel:** 4.12.14-23-default  
- **Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++  
- **Compiler Build:** 20181018 for Linux;  
  Fortran: Version 19.0.1.144 of Intel Fortran  
  Compiler Build 20181018 for Linux  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version U30 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:** jemalloc memory allocator V5.0.1

### Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench</td>
<td>56</td>
<td>6.93</td>
</tr>
<tr>
<td>602.gcc</td>
<td>56</td>
<td>9.71</td>
</tr>
<tr>
<td>605.mcf</td>
<td>56</td>
<td>13.6</td>
</tr>
<tr>
<td>620.omnetpp</td>
<td>56</td>
<td>9.17</td>
</tr>
<tr>
<td>623.xalancbmk</td>
<td>56</td>
<td>12.5</td>
</tr>
<tr>
<td>625.x264</td>
<td>56</td>
<td>14.7</td>
</tr>
<tr>
<td>631.deepsjeng</td>
<td>56</td>
<td>5.53</td>
</tr>
<tr>
<td>641.leela</td>
<td>56</td>
<td>4.89</td>
</tr>
<tr>
<td>648.exchange2</td>
<td>56</td>
<td>14.5</td>
</tr>
<tr>
<td>657.xz</td>
<td>56</td>
<td>23.6</td>
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SPECspeed2017_int_peak = Not Run

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Results Table

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<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>600.perlbench_s</td>
<td>56</td>
<td>255</td>
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<td>256</td>
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<td>6.88</td>
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<td>602.gcc_s</td>
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<td>409</td>
<td>9.74</td>
<td>410</td>
<td>9.71</td>
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<tr>
<td>605.mcf_s</td>
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<td>376</td>
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<td>175</td>
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<td>623.xalancbmk_s</td>
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<tr>
<td>625.x264_s</td>
<td>56</td>
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<td>14.8</td>
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<td>14.7</td>
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<td>259</td>
<td>5.53</td>
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<td>5.53</td>
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<tr>
<td>641.leela_s</td>
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<td>648.exchange2_s</td>
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<td>203</td>
<td>14.5</td>
<td>204</td>
<td>14.4</td>
<td>203</td>
<td>14.5</td>
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<tr>
<td>657.xz_s</td>
<td>56</td>
<td>261</td>
<td>23.7</td>
<td>262</td>
<td>23.6</td>
<td>261</td>
<td>23.6</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 10.3
SPECspeed2017_int_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=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017_B0/lib/ia32:/home/cpu2017_B0/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017_B0/je5.0.1-32:/home/cpu2017_B0/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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
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.

(Continued on next page)
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General Notes (Continued)
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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 Power Management set to Enabled
Sysinfo program /home/cpu2017_B0/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-9mbf Fri Apr 12 08:28:27 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) Platinum 8280M CPU @ 2.70GHz
  2.  "physical id"'s (chips)
  56 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 1

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Platform Notes (Continued)

- Core(s) per socket: 28
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8280M CPU @ 2.70GHz
- Stepping: 6
- CPU MHz: 2700.000
- BogoMIPS: 5400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 39424K
- NUMA node0 CPU(s): 0-27
- NUMA node1 CPU(s): 28-55
- Flags:
  - fpu vme de pse tsc msr pae mca c6000866 cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpkgb 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 fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault ebpx cat13 cdpl13 invpcid_single intel_ppin mba tpr_shadow vmx fms xfbm perfmon ept vpid fsgsbase tsc_adjust bnd id hle avx2 smep bm12 1mes invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap cflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsave xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida arat pln pts pkp ospke avx512_vnni arch_capabilities ssbd

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 20 21 22 23 24 25 26 27
- node 0 size: 193016 MB
- node 0 free: 192339 MB
- node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
- node 1 size: 193332 MB
- node 1 free: 193158 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

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Platform Notes (Continued)

From /proc/meminfo
MemTotal: 395621016 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
    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 linux-9mbf 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 12 08:26

SPEC is set to: /home/cpu2017_B0
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sdb4 xfs 436G 308G 129G 71% /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 U30 02/02/2019
    Memory:
        24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)
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Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)  
657.xz_s(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CXXC 620.omnetpp_s(base) 623.xalanchmk_s(base) 631.deepsjeng_s(base)  
641.leela_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
FC  648.exchange2_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64

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Base Portability Flags (Continued)

623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-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

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

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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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