**SPEC CPU®2017 Integer Speed Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
Synergy 660 Gen10  
(3.80 GHz, Intel Xeon Platinum 8256)

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
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</table>
| OS: SUSE Linux Enterprise Server 15 (x86_64)  
Kernel 4.12.14-23-default  
Compiler: C/C++: Version 19.0.2.187 of Intel C/C++  
Compiler Build 20190117 for Linux;  
Fortran: Version 19.0.2.187 of Intel Fortran  
Compiler Build 20190117 for Linux  
Parallel: Yes  
Firmware: HPE BIOS Version I43 02/02/2019 released Apr-2019  
File System: btrfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: Not Applicable  
Other: jemalloc memory allocator V5.0.1  
Power Management: -- |
| CPU Name: Intel Xeon Platinum 8256  
Max MHz: 3900  
Nominal: 3800  
Enabled: 16 cores, 4 chips  
Orderable: 2, 4 chip(s)  
Cache L1: 32 KB I+ 32 KB D on chip per core  
L2: 1 MB I+D on chip per core  
L3: 16.5 MB I+D on chip per chip  
Other: None  
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
Storage: 1 x 480 GB SATA SSD, RAID 0  
Other: None |

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**SPECspeed®2017_int_base = 9.49**

**SPECspeed®2017_int_peak = Not Run**

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**Threads**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>16</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>16</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>16</td>
</tr>
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</tr>
<tr>
<td>648.exchange2_s</td>
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<tr>
<td>657.xz_s</td>
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**Software Availability:** Feb-2019
### 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:
/home/cpu2017_u2/je5.0.1-32:/home/cpu2017_u2/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
```
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.
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

(Continued on next page)
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**General Notes (Continued)**


**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
- Minimum Processor Idle Power Core C-State set to C1E State
- 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 9bcde8f2999c33d61f64985e45859ea9
running on sy660-gen10 Fri Apr 26 14:06:08 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 8256 CPU @ 3.80GHz
4 "physical id"s (chips)
16 "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 2 5 9 13
physical 1: cores 2 5 9 13
physical 2: cores 5 8 9 13
physical 3: cores 2 5 9 13

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 4

(Continued on next page)
### Platform Notes (Continued)

| NUMA node(s): | 4 |
| Vendor ID: | GenuineIntel |
| CPU family: | 6 |
| Model: | 85 |
| Model name: | Intel(R) Xeon(R) Platinum 8256 CPU @ 3.80GHz |
| Stepping: | 6 |
| CPU MHz: | 3800.000 |
| BogoMIPS: | 7600.00 |
| Virtualization: | VT-x |
| L1d cache: | 32K |
| L1i cache: | 32K |
| L2 cache: | 1024K |
| L3 cache: | 16896K |
| NUMA node0 CPU(s): | 0-3 |
| NUMA node1 CPU(s): | 4-7 |
| NUMA node2 CPU(s): | 8-11 |
| NUMA node3 CPU(s): | 12-15 |

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 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 epb cat_13 cdp_13 invpcid_single intel_ppin mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsave xsaveopt xsaveprec xsaves cqm_llc cqm_occurr_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd |
```

/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: 4 nodes (0-3) |
| node 0 cpus: 0 1 2 3 |
| node 0 size: 193049 MB |
| node 0 free: 192826 MB |
| node 1 cpus: 4 5 6 7 |
| node 1 size: 193506 MB |
| node 1 free: 193268 MB |
| node 2 cpus: 8 9 10 11 |
| node 2 size: 193534 MB |
| node 2 free: 193382 MB |
| node 3 cpus: 12 13 14 15 |
| node 3 size: 193326 MB |
| node 3 free: 192958 MB |
```

(Continued on next page)
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Platform Notes (Continued)

node distances:

node 0 1 2 3
0: 10 21 21 21
1: 21 10 21 21
2: 21 21 10 21
3: 21 21 21 10

From /proc/meminfo:
MemTotal: 791978900 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 sy660-gen10 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 26 14:05

SPEC is set to: /home/cpu2017_u2

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 SMI BIOS" standard.

BIOS HPE I43 02/02/2019
Memory:
24x UNKNOWN NOT AVAILABLE

(Continued on next page)
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Platform Notes (Continued)

24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 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 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
---

C++     | 620.omnetpp_s(base) 623.xalancbmk_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 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
---

Fortran | 648.exchange2_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.
---

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
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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
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:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/home/cpu2017_u2/je5.0.1-64/ -ljemalloc

C++ benchmarks:
-W1,-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
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-03.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 CPU®2017 v1.0.5 on 2019-04-26 15:06:07-0400.