SPEC CPU®2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL580 Gen10
(2.50 GHz, Intel Xeon Gold 5215)

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

SPECSpeed®2017_int_base = 8.37
SPECSpeed®2017_int_peak = Not Run

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

Threads

| Threads     | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 14.0 | 15.0 | 16.0 | 17.0 | 18.0 | 19.0 | 20.0 | 21.0 |
|-------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 600.perbench_s | 40 |     |     | 5.88 |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 602.gcc_s      | 40 |     |     | 7.54 |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 605.mcf_s      | 40 |     | 10.9|     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 620.omnetpp_s  | 40 |     | 5.62|     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 623.xalancbmk_s| 40 |     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      | 10.8 |
| 625.x264_s     | 40 |     |     |     |     |     |     |     | 11.8|     |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 631.deepsjeng_s| 40 |     |     | 4.74|     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 641.leela_s    | 40 |     |     |     | 4.15|     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 648.exchange2_s| 40 |     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      | 12.2 |      |
| 657.xz_s       | 40 |     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      | 20.2 |

--- SPECSpeed®2017_int_base (8.37) ---

Hardware

CPU Name: Intel Xeon Gold 5215
Max MHz: 3400
Nominal: 2500
Enabled: 40 cores, 4 chips
Orderable: 1, 2, 3, 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: 13.75 MB I+D on chip per chip
Other: None
Memory: 768 GB (24 x 32 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 960 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 19.0.2.187 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 U34 05/21/2019 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
Power Management: --
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SPECspeed®2017_int_peak = Not Run

Results Table

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</tbody>
</table>

SPECspeed®2017_int_base = 8.37
SPECspeed®2017_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
Files system 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
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
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**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
- Advanced Memory Protection set to Advanced ECC

Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-sypg Sat Sep 22 04:33:01 2018

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 5215 CPU @ 2.50GHz
- 4 "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 : 10
  - siblings : 10
  - physical 0: cores 0 1 2 3 4 8 9 10 11 12
  - physical 1: cores 0 1 2 3 4 8 9 10 11 12
  - physical 2: cores 0 1 2 3 4 8 9 10 11 12
  - physical 3: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 40
- On-line CPU(s) list: 0-39
- Thread(s) per core: 1
- Core(s) per socket: 10
- Socket(s): 4
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85

(Continued on next page)
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**CPU2017 License:** 3
**Test Sponsor:** HPE
**Tested by:** HPE

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**Platform Notes (Continued)**

<table>
<thead>
<tr>
<th>Model name:</th>
<th>Intel(R) Xeon(R) Gold 5215 CPU @ 2.50GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stepping:</td>
<td>6</td>
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<tr>
<td>CPU MHZ:</td>
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<td>BogoMIPS:</td>
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<tr>
<td>Virtualization:</td>
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<tr>
<td>L1d cache:</td>
<td>32K</td>
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<td>L1i cache:</td>
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<td>L2 cache:</td>
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<td>L3 cache:</td>
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<td>NUMA node0 CPU(s):</td>
<td>0-9</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>10-19</td>
</tr>
<tr>
<td>NUMA node2 CPU(s):</td>
<td>20-29</td>
</tr>
<tr>
<td>NUMA node3 CPU(s):</td>
<td>30-39</td>
</tr>
<tr>
<td>Flags:</td>
<td>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 aperfmpref 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 lbm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel.ppin mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnow pt invpcid rtm cqm mpx rdt_a aovx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occump_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd</td>
</tr>
</tbody>
</table>

```
From /proc/cpuinfo cache data
    cache size : 14080 KB
```

WARNING: a numactl 'node' might or might not correspond to a physical chip.

```
/proc/cpuinfo cache data
    cache size : 14080 KB
```

(Continued on next page)
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Test Sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

2: 21 21 10 21
3: 21 21 21 10

From /proc/meminfo
MemTotal: 792260568 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 linux-sypg 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 Sep 22 04:31

SPEC is set to: /home/cpu2017_u2

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 xfs 894G 92G 803G 11% /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 U34 05/21/2019
Memory:
24x UNKNOWN NOT AVAILABLE
24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2666

(End of data from sysinfo program)
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**SPECspeed®2017_int_base = 8.37**

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**Compiler Version Notes**

```plaintext
==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)</th>
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<tr>
<td></td>
<td>625.x264_s(base) 657.xz_s(base)</td>
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<tr>
<td>---------</td>
<td>--------------------------------------------------------</td>
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<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
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<tr>
<td>Version 19.0.2.187 Build 20190117</td>
<td>Copyright (C) 1985-2019 Intel Corporation. All rights reserved.</td>
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```

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**Base Compiler Invocation**

- C benchmarks:
  ```plaintext
  icc -m64 -std=c11
  ```

- C++ benchmarks:
  ```plaintext
  icpc -m64
  ```

- Fortran benchmarks:
  ```plaintext
  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/home/cpu2017_u2/je5.0.1-64/ -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-ic19.0u1-flags-linux64.2019-12-10.html
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-ic19.0u1-flags-linux64.2019-12-10.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 CPU®2017 v1.0.5 on 2018-09-22 04:33:00-0400.
Report generated on 2019-12-10 14:55:54 by CPU2017 PDF formatter v6255.
Originally published on 2019-12-10.