**SPEC® CPU2017 Integer Speed Result**

**Hewlett Packard Enterprise**

*Test Sponsor: HPE*

ProLiant DL560 Gen10

*(3.80 GHz, Intel Xeon Gold 5222)*

<table>
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<tr>
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<tr>
<td>SPECspeed2017_int_peak</td>
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CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

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**Hardware**

CPU Name: Intel Xeon Gold 5222

Max MHz.: 3900

Nominal: 3800

Enabled: 16 cores, 4 chips

Orderable: 1, 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: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)

Storage: 1 x 400 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 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
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.80 GHz, Intel Xeon Gold 5222)

SPEC CPU2017 Integer Speed Result
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SPECspeed2017_int_base = 9.44
SPECspeed2017_int_peak = Not Run

Results Table

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</table>

SPECspeed2017_int_base = 9.44
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_u2/lib/ia32:/home/cpu2017_u2/lib/intel64:
/home/cpu2017_u2/jemalloc5.0.1-32:/home/cpu2017_u2/jemalloc5.0.1-64"
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.
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.80 GHz, Intel Xeon Gold 5222)

SPECspeed2017_int_base = 9.44
SPECspeed2017_int_peak = Not Run

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-erfc Tue Apr 16 10:12:43 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
 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 1 2 4 13
  physical 1: cores 2 5 9 13
  physical 2: cores 2 4 8 13
  physical 3: cores 0 9 11 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
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
Spec CPU2017 Integer Speed Result

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(Test Sponsor: HPE)
ProLiant DL560 Gen10
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SPECspeed2017_int_base = 9.44
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Platform Notes (Continued)

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
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 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 napl xtopology nonstop_tsc cpuid
aperfperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtrm pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt
ptc deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
epb cat_13 cdpl_l3 invpcid_single intel_pinn mba tpr_shadow vmni fpxprec ept
vpid fsbgbase tsc_adjust bni1 hle avx2 smep bmi2 2ers invpcid rtm cmq mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsave cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

/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: 386627 MB
node 0 free: 386422 MB
node 1 cpus: 4 5 6 7
node 1 size: 387070 MB
node 1 free: 386800 MB
node 2 cpus: 8 9 10 11
node 2 size: 387070 MB
node 2 free: 386921 MB
node 3 cpus: 12 13 14 15
node 3 size: 387070 MB
node 3 free: 386808 MB
node distances:
node 0 1 2 3
0: 10 21 21 22
1: 21 10 21 22

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

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

From `/proc/meminfo`

- MemTotal: 1584988192 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-erfc 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 16 10:10

SPEC is set to: /home/cpu2017_u2

```
Filesystem  Type      Size  Used  Avail Use% Mounted on
/dev/sda2    btrfs      371G  76G   294G  21%  /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 02/02/2019
- Memory:
  - 48x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2666

(End of data from `sysinfo` program)
**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
**ProLiant DL560 Gen10**  
(3.80 GHz, Intel Xeon Gold 5222)  

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<th>Test Date: Apr-2019</th>
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<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Apr-2019</td>
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<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Feb-2019</td>
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**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)

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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-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/Intel-ic18.0-official-linux64.2019-04-03.xml
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.

Tested with SPEC CPU2017 v1.0.5 on 2019-04-16 00:42:42-0400.