## SPEC® CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL580 Gen10  
(2.20 GHz, Intel Xeon Gold 5120)

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>7.56</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### CPU2017 License: 3
Test Sponsor: HPE  
Tested by: HPE  
Test Date: Feb-2018  
Hardware Availability: Nov-2017  
Software Availability: Sep-2017

### Hardware
- **CPU Name:** Intel Xeon Gold 5120  
- **Max MHz.:** 3200  
- **Nominal:** 2200  
- **Enabled:** 56 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:** 19.25 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
- **Storage:** 1 x 480 GB SATA SSD, RAID 0  
- **Other:** None

### Software
- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
- **Kernel:** 3.10.0-693.el7.x86_64  
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++  
- **Compiler for Linux:** Fortran: Version 18.0.0.128 of Intel Fortran  
- **Compiler for Linux:**  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version U34 released Nov-2017 (tested as U34 11/14/2017)  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc memory allocator library V5.0.1
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| Benchmark     | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Base          | Peak
|---------------|---------|---------|-------|---------|-------|---------|-------|---------------|------
| perlbench_s   | 56      | 334     | 5.31  | 334     | 5.32  | 331     | 5.36  |
| gcc_s         | 56      | 511     | 7.79  | 512     | 7.78  | 508     | 7.84  |
| mcf_s         | 56      | 492     | 9.59  | 492     | 9.59  | 485     | 9.74  |
| omnetpp_s     | 56      | 315     | 5.18  | 317     | 5.15  | 315     | 5.17  |
| xalancbmk_s   | 56      | 175     | 8.08  | 176     | 8.05  | 176     | 8.06  |
| x264_s        | 56      | 174     | 10.1  | 175     | 10.1  | 175     | 10.1  |
| deepsjeng_s   | 56      | 329     | 4.36  | 330     | 4.35  | 329     | 4.35  |
| leela_s       | 56      | 457     | 3.74  | 456     | 3.74  | 456     | 3.74  |
| exchange2_s   | 56      | 256     | 11.5  | 255     | 11.5  | 254     | 11.6  |
| xz_s          | 56      | 318     | 19.4  | 322     | 19.2  | 318     | 19.4  |

SPECspeed2017_int_base = 7.56
SPECspeed2017_int_peak = Not Run

Results Table

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SPECspeed2017_int_base = 7.56
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
Filesystem page cache cleared with:
  shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
irqbalance disabled with "systemctl stop irqbalance"
tuned profile set with "tuned-adm profile throughput-performance"

General Notes

Environment variables set by runcpu before the start of the run:
  KMP_AFFINITY = "granularity=fine,compact"
  LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
  OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;
built with RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;
Platform Notes

BIOS Configuration:
- Intel Hyperthreading set to Disabled
- Thermal Configuration set to Maximum Cooling
- LLC Prefetch set to Enabled
- LLC Dead Line Allocation set to Disabled
- Stale A to S set to Enabled
- Memory Patrol Scrubbing set to Disabled
- Workload Profile set to General Peak Frequency Compute
- Energy/Performance Bias set to Maximum Performance
- Workload Profile set to Custom
- NUMA Group Size Optimization set to Flat
- Uncore Frequency Scaling set to Auto
- Sysinfo program /home/cpu2017/bin/sysinfo
- Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
- running on dl580_jk_rhel74 Fri Feb 2 01:00:01 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 5120 CPU @ 2.20GHz
- 4 "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 : 14
  - siblings : 14
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

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
- Core(s) per socket: 14
- Socket(s): 4
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz

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SPECspeed2017_int_base = 7.56
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

Stepping: 4
CPU MHz: 2200.000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-13
NUMA node1 CPU(s): 14-27
NUMA node2 CPU(s): 28-41
NUMA node3 CPU(s): 42-55
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 pdppe1gb rdtsscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma
cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx fl64c rdrand lahf_lm abm 3nowprefetch epb cat_13 cdp_13 intel_pt
trer_shadow vnmi flexpriority ept vpid fsgsgbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb
avx512cd avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 cqm_llc cqm_occup_llc
cqm_mbb_total cqm_mbb_local dtherm ida arat pni

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 4 5 6 7 8 9 10 11 12 13
  node 0 size: 196267 MB
  node 0 free: 191591 MB
  node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  node 1 size: 196608 MB
  node 1 free: 192259 MB
  node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41
  node 2 size: 196608 MB
  node 2 free: 192111 MB
  node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55
  node 3 size: 196607 MB
  node 3 free: 192212 MB
  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

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Platform Notes (Continued)

From /proc/meminfo
MemTotal: 792288896 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.4 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VARIANT_ID="7.4"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
Linux dl580_jk_rhel74 3.10.0-693.el7.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017 x86_64
x86_64 x86_64 GNU/Linux

run-level 3 Feb 2 00:55

SPEC is set to: /home/cpu2017

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 11/14/2017
Memory:
48x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2400

(End of data from syinfo program)

Compiler Version Notes

CC 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(base)

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HPE

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

Test Date: Feb-2018
Hardware Availability: Nov-2017
Software Availability: Sep-2017

Compiler Version Notes (Continued)

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
641.leela_s(base)

==============================================================================
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC 648.exchange2_s(base)

==============================================================================
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

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
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**CPU2017 License:** 3  
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## Base Optimization Flags

**C benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
- `-qopt-mem-layout-trans=3 -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=3 -L/usr/local/je5.0.1-64/lib -ljemalloc`

**Fortran benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
- `-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte`  
- `-L/usr/local/je5.0.1-64/lib -ljemalloc`

## Base Other Flags

**C benchmarks:**
- `-m64 -std=c11`

**C++ benchmarks:**
- `-m64`

**Fortran benchmarks:**
- `-m64`

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-SKX-revH.html](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.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-SKX-revH.xml](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.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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