## SPEC® CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant BL460c Gen10  
(2.60 GHz, Intel Xeon Gold 6132)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>8.55</th>
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</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>Not Run</td>
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</tbody>
</table>

### Test Data
- **CPU2017 License:** 3  
- **Test Sponsor:** HPE  
- **Tested by:** HPE

### Performance Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Value (Threads)</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>28</td>
</tr>
<tr>
<td>602.gcc_s</td>
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<tr>
<td>605.mcf_s</td>
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</tr>
<tr>
<td>620.omnetpp_s</td>
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<tr>
<td>623.xalancbmk_s</td>
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</tr>
<tr>
<td>625.x264_s</td>
<td>28</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>28</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>28</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>28</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>28</td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** Intel Xeon Gold 6132  
- **Max MHz.:** 3700  
- **Nominal:** 2600  
- **Enabled:** 28 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:** 19.25 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 1 x 480 GB SATA SSD, RAID 0  
- **Other:** None

### Software
- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
- **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 I41 11/14/2017 released Nov-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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**SPECspeed2017_int_base = 8.55**

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<td>HPE</td>
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<td>Tested by</td>
<td>HPE</td>
</tr>
<tr>
<td>Test Date</td>
<td>Dec-2017</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Nov-2017</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

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#### Results Table

<table>
<thead>
<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>
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<tbody>
<tr>
<td>600.perlbench_s</td>
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<td>6.15</td>
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<tr>
<td>602.gcc_s</td>
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<tr>
<td>605.mcf_s</td>
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<td>623.xalancbmk_s</td>
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<td>9.26</td>
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<td>9.32</td>
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<tr>
<td>625.x264_s</td>
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<td>11.6</td>
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<td>11.6</td>
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<tr>
<td>631.deepsjeng_s</td>
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<tr>
<td>641.leela_s</td>
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<td>4.31</td>
<td>395</td>
<td>4.32</td>
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<tr>
<td>648.exchange2_s</td>
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<td>657.xz_s</td>
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<td>20.6</td>
<td>302</td>
<td>20.5</td>
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</tbody>
</table>

**SPECspeed2017_int_base = 8.55**

**SPECspeed2017_int_peak = Not Run**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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### Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Transparent Huge Pages enabled by default

Filesystem page cache cleared with:

```shell
  shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
```

```
  irqbalance service stopped using "systemctl stop irqbalance.service"
```

Used throughput-performance profile for tuned-adm: "tuned-adm profile throughput-performance profile"

---

### 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

(Continued on next page)
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General Notes (Continued)

The system as described on this result page was formerly
generally available. At the time of this publication, it may
not be shipping, and/or may not be supported, and/or may fail
to meet other tests of General Availability described in the

This measured result may not be representative of the result
that would be measured were this benchmark run with hardware
and software available as of the publication date.

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 Hyper-Threading set to Disabled
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
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
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on bl460c16 Mon Dec 18 16:41:49 2017

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 6132 CPU @ 2.60GHz
    2 *physical id"s (chips)
    28 "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

(Continued on next page)
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SPECspeed2017_int_peak = Not Run

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

Test Date: Dec-2017
Hardware Availability: Nov-2017
Software Availability: Sep-2017

Platform Notes (Continued)

From lscpu:
   Architecture:          x86_64
   CPU op-mode(s):        32-bit, 64-bit
   Byte Order:            Little Endian
   CPU(s):                28
   On-line CPU(s) list:   0-27
   Thread(s) per core:    1
   Core(s) per socket:    14
   Socket(s):             2
   NUMA node(s):          2
   Vendor ID:             GenuineIntel
   CPU family:            6
   Model:                 85
   Model name:            Intel(R) Xeon(R) Gold 6132 CPU @ 2.60GHz
   Stepping:              4
   CPU MHz:               2600.000
   BogoMIPS:              5200.00
   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
   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 rdtpsc
                           lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
                           aperfmperf 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 f16c rdrand lahf_lm abm 3dnowprefetch eb  cat_13 cd p_l3 intel_pt
                           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
                           avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc
                           cqm_mbb_total cqm_mbb_local dtherm ida arat pin pts
   /proc/cpuinfo cache data
   cache size : 19712 KB

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

From /proc/meminfo
MemTotal:       197750280 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

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Platform Notes (Continued)

os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.4 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VARIANT="Server"
  VARIANT_ID="server"
  VERSION_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 bl460c16 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 Dec 18 16:37

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 839G 38G 802G 5% /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 I41 11/14/2017
Memory:
  4x UNKNOWN NOT AVAILABLE
  12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo 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)
==============================================================================
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)

(Continued on next page)
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Compiler Version Notes (Continued)

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

Base Optimization Flags

C benchmarks:
-Wl, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div

(Continued on next page)
### Base Optimization Flags (Continued)

C benchmarks (continued):
- `-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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