### SPEC® CPU2017 Integer Speed Result

**Test Sponsor:** HPE  
**Model:** ProLiant DL360 Gen10  
**CPU:** 2.10 GHz, Intel Xeon Platinum 8160

**Software Availability:** Oct-2017  
**Test Availability:** Oct-2017  
**Test Date:** Nov-2017  
**Hardware:** Intel Xeon Platinum 8160  
**Memory:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R)  
**Other:** None

### Performance Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Value</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>6.17</td>
<td>48</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>9.14</td>
<td>48</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>11.2</td>
<td>48</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>7.00</td>
<td>48</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>9.36</td>
<td>48</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>5.05</td>
<td>48</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>4.32</td>
<td>48</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>13.4</td>
<td>48</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>22.2</td>
<td>48</td>
</tr>
</tbody>
</table>

**SPECspeed2017_int_base = 8.92**  
**SPECspeed2017_int_peak = Not Run**

### Hardware

**CPU Name:** Intel Xeon Platinum 8160  
**Max MHz.:** 3700  
**Nominal:** 2100  
**Enabled:** 48 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:** 33 MB I+D on chip per chip  
**Other:** None  
**Memory:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R)  
**Storage:** 1 x 400 GB SATA SSD, RAID 0  
**Other:** None

### Software

**OS:** Red Hat Enterprise Linux Server release 7.3 (Maipo)  
**Kernel:** 3.10.0-514.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 U32 released Oct-2017 (tested with U32 9/29/2017)  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:**  
- jemalloc: jemalloc memory allocator library V5.0.1;  
- jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;  
- jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;  
- jemalloc: sources available from jemalloc.net or releases
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.10 GHz, Intel Xeon Platinum 8160)

SPECspeed2017_int_base = 8.92
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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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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>288</td>
<td>6.16</td>
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<td>6.21</td>
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<td>605.mcf_s</td>
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<td>421</td>
<td>11.2</td>
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<td>11.2</td>
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<td>11.1</td>
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<td>620.omnetpp_s</td>
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<td>6.85</td>
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<tr>
<td>625.x264_s</td>
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<td>11.8</td>
<td>149</td>
<td>11.8</td>
<td>149</td>
<td>11.8</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>48</td>
<td>284</td>
<td>5.05</td>
<td>284</td>
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<td>283</td>
<td>5.06</td>
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<td>641.leela_s</td>
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<td>4.32</td>
<td>395</td>
<td>4.32</td>
<td>395</td>
<td>4.32</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td>220</td>
<td>13.4</td>
<td>221</td>
<td>13.3</td>
<td>220</td>
<td>13.4</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>48</td>
<td>277</td>
<td>22.3</td>
<td>279</td>
<td>22.1</td>
<td>279</td>
<td>22.2</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 8.92
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"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/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

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
  Memory Patrol Scrubbing set to Disabled
  Workload Profile set to General Peak Frequency Compute

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

Platform Notes (Continued)

Energy/Performance Bias set to Maximum Performance
Workload Profile set to Custom
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on DL360G10 Sun Nov 5 11:21:09 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) Platinum 8160 CPU @ 2.10GHz
    2 "physical id"s (chips)
  48 "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 : 24
siblings : 24
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:
Architecture:    x86_64
CPU op-mode(s):  32-bit, 64-bit
Byte Order:      Little Endian
CPU(s):         48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s):       2
NUMA node(s):    2
Vendor ID:       GenuineIntel
CPU family:      6
Model:           85
Model name:      Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz
Stepping:        4
CPU MHz:         2100.000
BogoMIPS:        4204.67
Virtualization: VT-x
L1d cache:       32K
L1i cache:       32K
L2 cache:        1024K
L3 cache:        33792K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47

(Continued on next page)
Hewlett Packard Enterprise
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<table>
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<td>Hardware Availability: Oct-2017</td>
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</tbody>
</table>

Platform Notes (Continued)

/proc/cpuinfo cache data
  cache size : 33792 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  node 0 size: 97963 MB
  node 0 free: 94204 MB
  node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
  node 1 size: 98303 MB
  node 1 free: 94789 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo

* MemTotal: 197746172 kB
* HugePages_Total: 0
* Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*

* os-release:
  * NAME="Red Hat Enterprise Linux Server"
  * VERSION="7.3 (Maipo)"
  * ID="rhel"
  * ID_LIKE="fedora"
  * VERSION_ID="7.3"
  * PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
  * ANSI_COLOR="0;31"
  * CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
  * redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
  * system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

uname -a:

Linux DL360G10 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016 x86_64 x86_64 GNU/Linux

run-level 3 Nov 5 07:02

SPEC is set to: /home/cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/rhel_dl360g10-home</td>
<td>xfs</td>
<td>318G</td>
<td>40G</td>
<td>279G</td>
<td>13%</td>
<td>/home</td>
</tr>
</tbody>
</table>

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)
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Platform Notes (Continued)

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 U32 09/29/2017
Memory:
24x UNKNOWN NOT AVAILABLE 8 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)
    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:
iccc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
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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:
-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
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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-revF.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-revF.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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